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Volume 20 June 1951 Number 6

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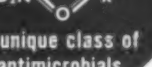

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Volume 20 JUNE 1951 *Number 6*

CONTENTS

A CRITICAL APPRAISAL OF CURRENT PRACTICES IN THE CLINICAL DIAGNOSIS OF LEAD INTOXICATION	Robert A. Kehoe, M.D.	253
THE TREATMENT OF OPEN FRACTURES OF THE HANDS	Michael L. Mason, M.D.	260
MEDICAL TESTIMONY FROM AN ATTORNEY'S STANDPOINT	James V. Donadio	264
CALORIC REQUIREMENTS OF THE OBESE	A. W. Pennington, M.D.	267
NON-SENSITIZATION OF NYLON THREAD	Sidney W. Jannes, M.D.	272
ALCOHOLISM IN INDUSTRY	George N. Thompson, M.D.	273
THE REHABILITATION OF ALCOHOLICS IN BUSINESS AND INDUSTRY	Clement C. Troensegaard, M.D., and Morse P. Manson, Ph.D.	277
THE PSYCHOLOGICAL EVALUATION OF ALCOHOLICS	Morse P. Manson, Ph.D.	281
PHYSICAL EXAMINATION IN INDUSTRY AS A CANCER CASE-FINDING PROCEDURE	C. D. Selby, M.D.	284
INDUSTRIAL INTOXICATION DUE TO PENTACHLOROPHENOL	Prof. Dr. Dr.h.c. E. W. Baader, and Dr. med. H. J. Bauer	286
THE A.M.A. COUNCIL ON INDUSTRIAL HEALTH	Jean Spencer Felton, M.D.	291
BOOKS		293
ASSOCIATION NEWS		295
SCIENCE MINIATURE: BERYLLIUM	Rutherford T. Johnstone, M.D.	296
EDITORIALS: "WHAT'S IN A NAME?" — ORGANIZED HETEROGENEITY		297
ASSOCIATIONS: Officers and Directors		4, 6, 8, 10
PERSONAL NEWS		6
NEWS, COMMENT, OPINION		39
[ADVERTISERS' INDEX		50]

[NOTE: The opinions expressed in the editorials of this Journal are not to be considered as necessarily representing the opinions of any associated organizations.]

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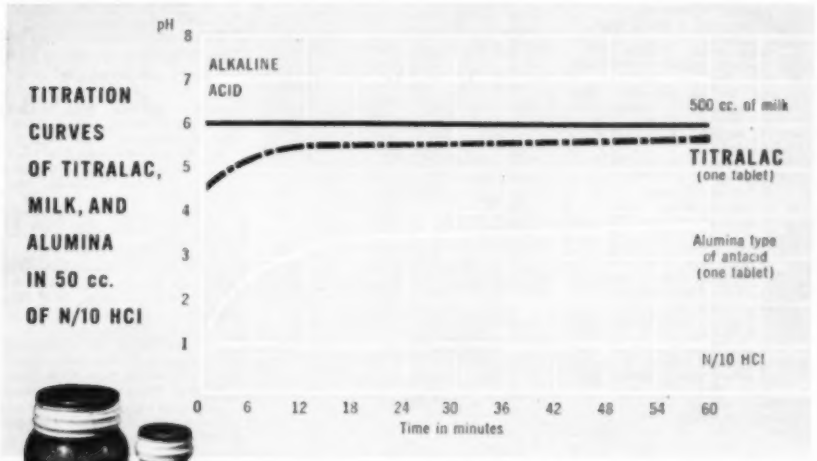

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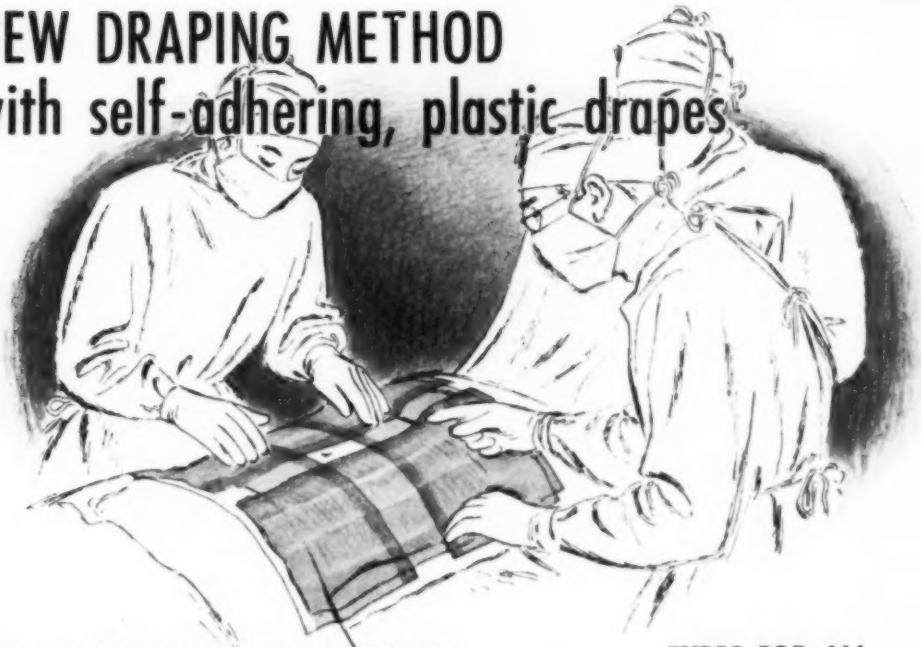

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George J. Kidera, M.D.

of the Army School of Aviation Medicine at Randolph Field, Texas. He joined United in 1937 to undertake a long-range project of applying medical research and techniques to commercial air transportation. He holds the 1949 John Jeffries Award of the Institute of Aeronautical Sciences for "outstanding contributions to the advancement of aeronautics through medical research." His military decorations include the U.S. Distinguished Service Medal, Foreign Legion of Honor and Belgian Order of Leopold. He is President of the Aero Medical Association as well as a member of many other medical societies. DR. KIDERA, with United since 1939, is a graduate of the University of Illinois School of Medicine. During World War II, he served four years as an Air Force flight surgeon, then returned to United in 1946 as head of the company's Chicago medical branch. He is a Fellow in aviation medicine of the Aero Medical Association and a member of the Airline Medical Directors Association, the American Medical Association, and the INDUSTRIAL MEDICAL ASSOCIATION.

WALLACE L. DAVIDSON, M.D., has been appointed Industrial Physician for the Glenolden and West Point, Pennsylvania, plants of Sharp & Dohme, Incorporated. A 1942 graduate of the University of Buffalo, DR. DAVIDSON received his M.D. from the Hahnemann Medical College in 1946 and served his internship at Hahnemann Hospital the following year. After two years as a Captain in the Medical Corps at

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Valley Forge General Hospital, DR. DAVIDSON worked in private practice until his present association with Sharp & Dohme. He is a member of the A.M.A., and Pennsylvania and Montgomery County Medical Societies.

American Academy

TWENTY-FIVE members and Fellows of the AMERICAN ACADEMY OF OCCUPATIONAL MEDICINE held an informal dinner meeting on April 24, 1951, at Atlantic City during the course of the 1951 Industrial Health Conference. The meeting was distinguished by the fact that there were no speeches made.

JOHN J. WITTMER, M.D., 55, died suddenly on Sunday, May 20, at his home in New Canaan, Connecticut, of a heart ailment. DR. WITTMER was born in Brooklyn; received his M.D. at Long Island College of Medicine, and interned at Long Island College Hospital. His career in industrial medicine began in 1923 when he became staff physician with the Brooklyn Edison Company. In 1937 he was appointed Medical Director of Consolidated Edison Company of New York, and in 1939 he took on the added duties of Personnel Director. He became an Assistant Vice-President in 1946, and on May 23, 1950, he was elected a Vice-President. During World War I, he served in the Army medical corps, and later he was Lieut. Commander, U.S. Naval Reserve. In the last war he was appointed consultant to the U.S. Secretary of State. He was Vice-President of New York City's Health Insurance Plan, and a member of the mayor's Advisory Committee on Puerto Rican Affairs.

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1954

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American Industrial Hygiene Association 4400 Fifth Ave., Pittsburgh 13, Pa HENRY F. SMYTH, Jr., Executive Secy.

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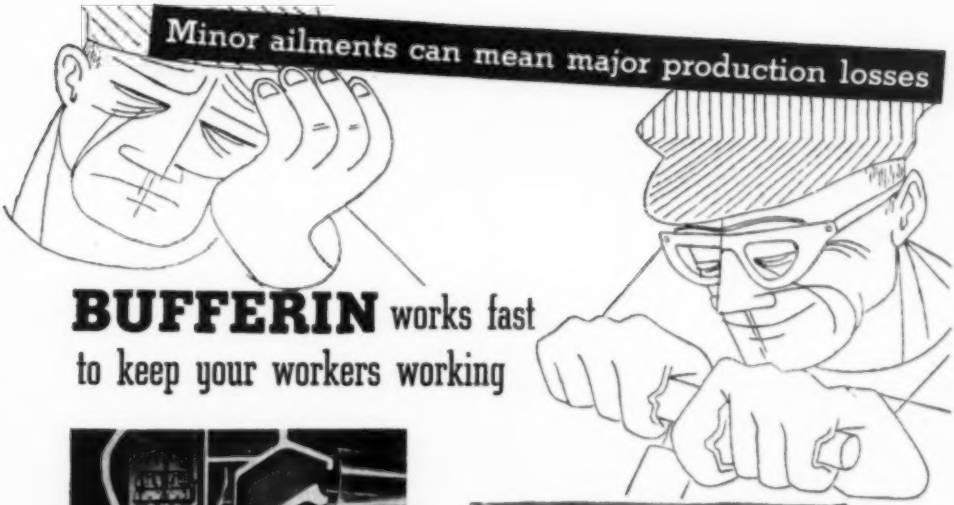

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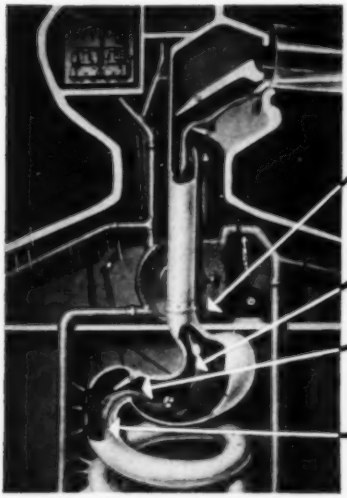

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REFERENCES:

1. *Combes, F. C., Zuckerman, R., and Canizares, O.: Diatrin Hydrochloride, A New Antihistaminic Agent for the Treatment of Pruritus and Allergic Dermatoses. Ann. All., 7:676, 1949*
2. *Kugelmass, I. N.: Antihistaminic Therapy of Allergic Disorders in Infants and Children. N. Y. State J. Med., 49:2313, 1949*
3. *Marton, S.: Diatrin, A New Antihistaminic with Minimal Side Reactions. Annals of Int. Med., 33:1444, 1950*

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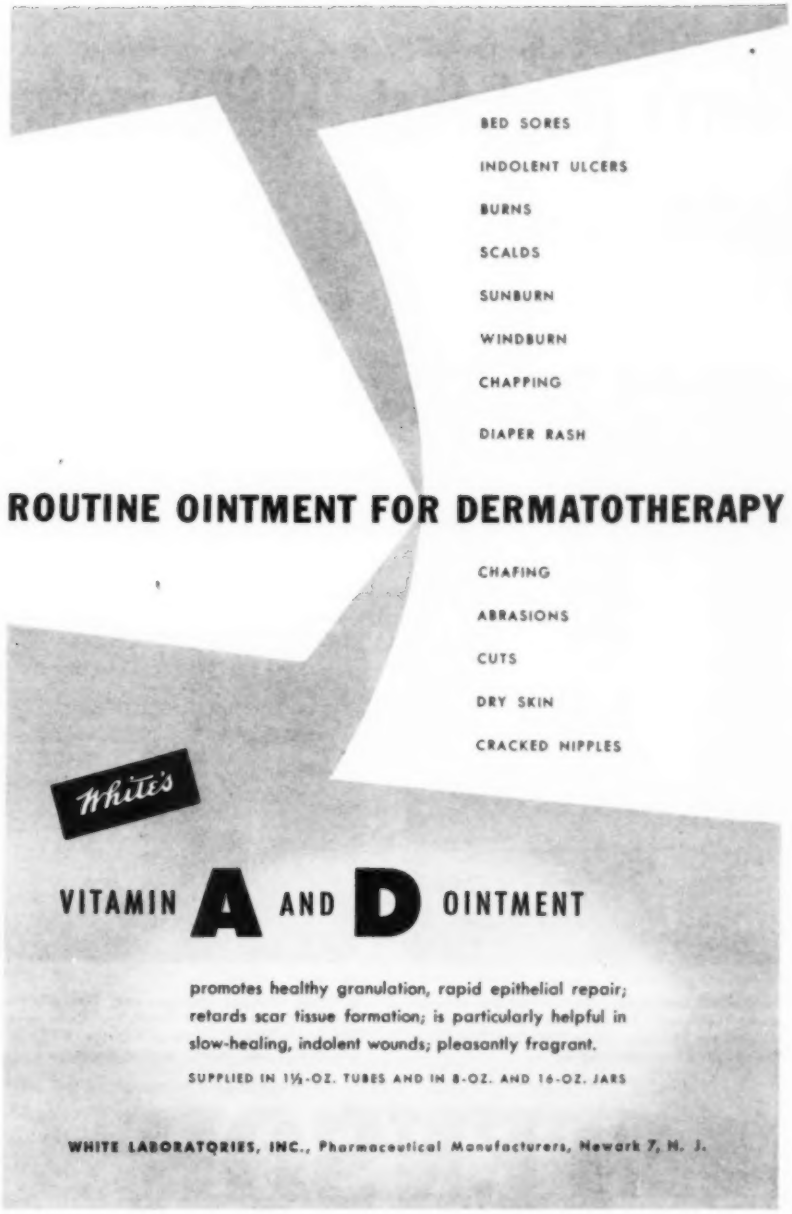
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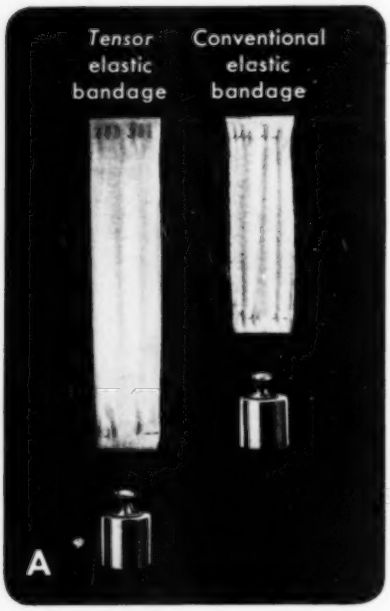

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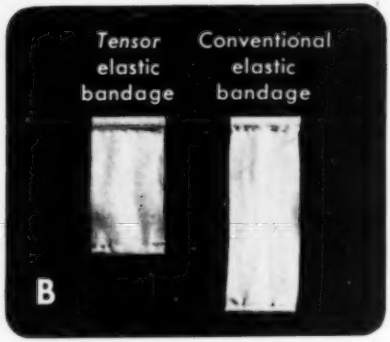

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1. Vitamin Supplements and Performance Capacity, Nutrition Reviews, October, 1950, p. 317.
2. Northern, C., Bulletin of Florida State Dept. of Agriculture, No. 123, pp. 20-23.

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REFERENCES: 1. Gray, L. A.: South. M. J. 34: 1004 (1941). 2. Frank, R. T.: Arch. Neurol. & Psychiat. 26: 1053 (1931). 3. Greenhill, J. P., and Freed, S. C.: J.A.M.A. 117: 504 (1941).

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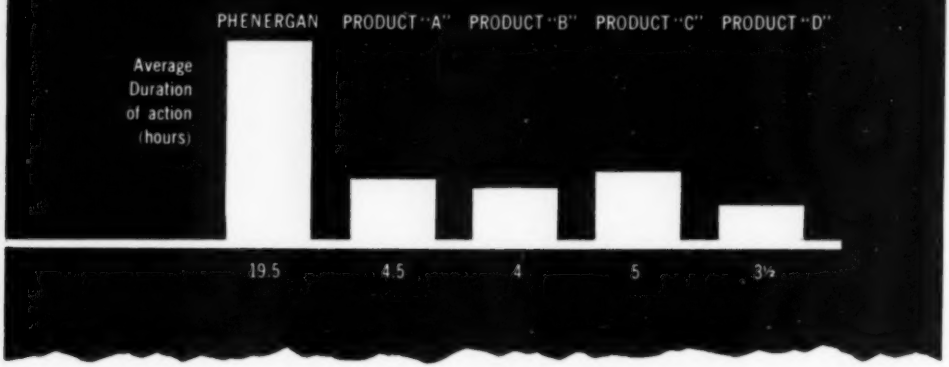

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1. Shulman, M.R.: Ann. Allergy, 7:506, 1949.

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1. Perloff, Wm. H., Treatment of the Menopause. II. In press

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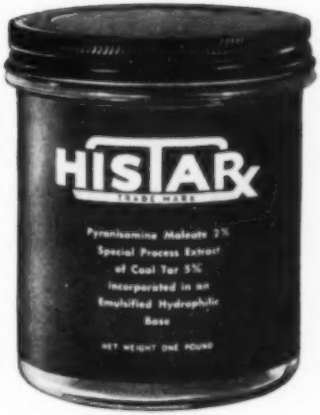

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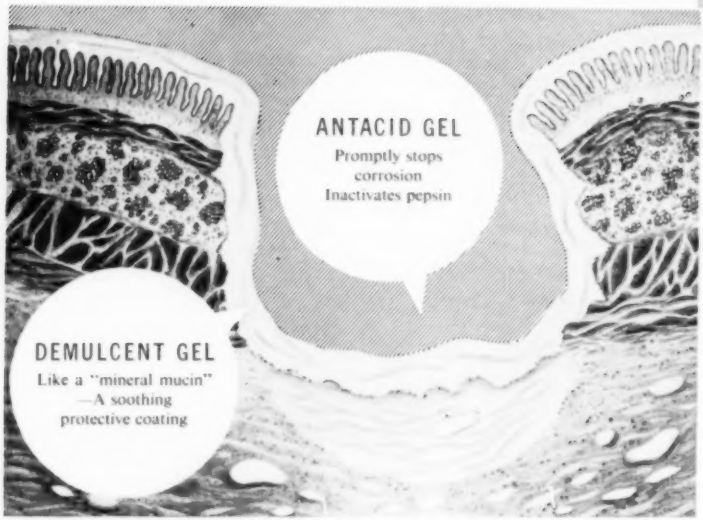

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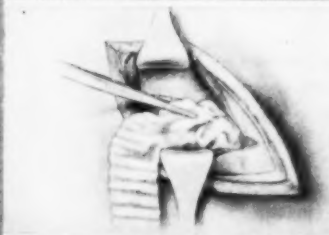

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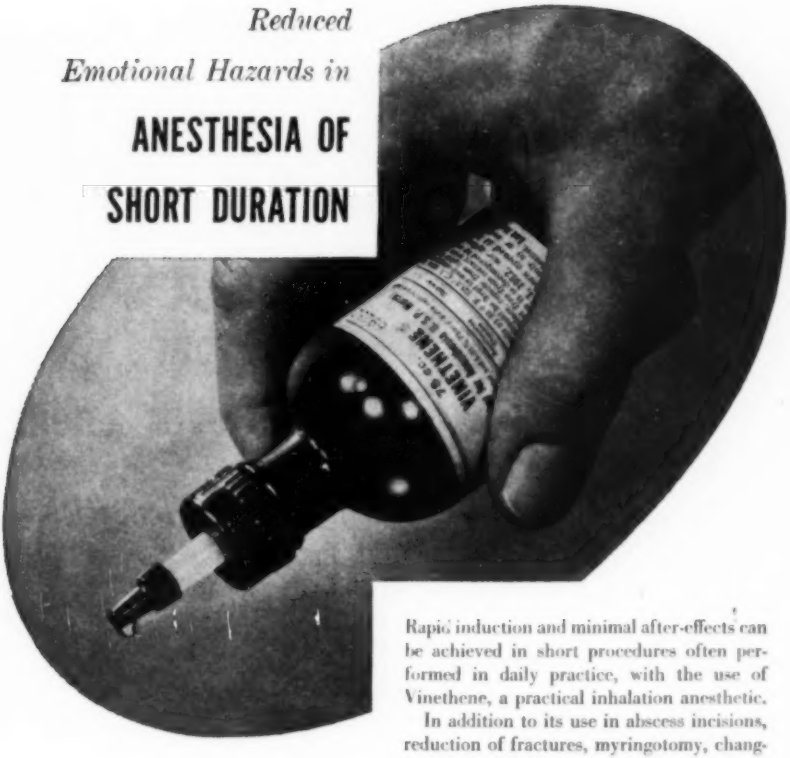

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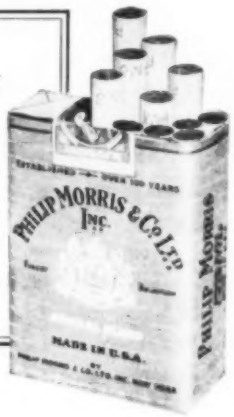

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1. Stahmer, A. H.: To be published.

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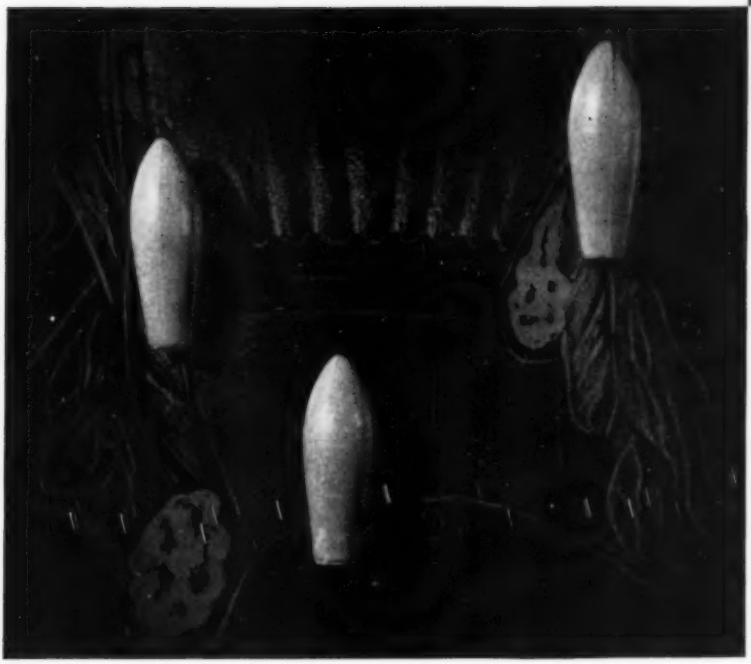

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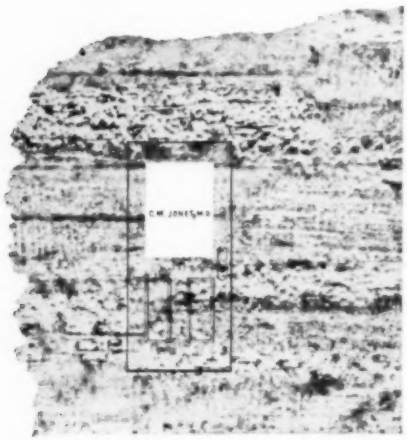

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Volume 20 JUNE 1951 *Number 6*

A Critical Appraisal of Current Practices in the Clinical Diagnosis of Lead Intoxication

ROBERT A. KEHOE, M.D.
Cincinnati, Ohio

THE diagnosis of lead intoxication has long been the subject of intense interest and of frequent controversy among clinicians, especially among those whose practice concerns itself with cases of actual or alleged occupational plumbism or with medicolegal evidence or testimony in connection with such cases. More recently, considerable numbers of non-medical persons have come to be concerned with this problem, through their responsibilities in industry for the appraisal or control of occupational lead hazards, and through their activities in workmen's compensation procedures, in governmental health and labor departments, in labor organizations and in trade associations. Nor does professional and lay concern end here, since every pediatrist, family physician and parent must pay attention to the usage of lead and lead compounds in the household under conditions which may threaten the health of infants and small children. To a much less significant extent, non-occupational lead poisoning occurs in the adult population as the result of a number of highly unusual situations, among which the most frequent, it seems, involve the use of lead pipe and lead-lined tanks for supplying and storing water for the household from a spring or well. Obviously, this hazard is limited almost entirely to rural areas, but members of poor families in many of our cities have also been poisoned by the use of battery boxes scavenged from city dumps as fuel for stoves and fireplaces.

This disease, therefore, may be found among persons of all ages and in all social and economic levels of society, and it is for this reason, primarily, that it is such a troublesome diagnostic problem in the field of general medicine. Non-occupational lead poisoning occurs infrequently, and therefore few physicians in general practice have had enough experience or knowledge to enable them to make prompt use of effective diagnostic measures which may be available, or to take the steps that will secure the future well-being and safety of patients who are, or who think themselves, afflicted with this illness. Occupational lead poisoning, on the other hand, is not rare in its occurrence among the patients of physicians engaged in private practice, but these cases occur largely among persons in the lower social and economic segments of the population and in the urban areas in which such persons live and work. They are not distributed evenly or widely among physicians engaged in private practice, and again, therefore, familiarity with the disease is sharply limited to a certain group of industrial physicians, to physicians who specialize in the study of occupational diseases, to those in certain communities whose private practice deals largely with the illnesses of laborers and their families, and to those who see patients in general hospitals in industrial centers. It is not surprising, therefore, that certain aspects of the diagnostic problem are obscure, and that diagnostic errors are numerous.

It is not within the scope of this paper to deal with all types of lead poisoning, or with the types of exposure to lead that give rise to them, or with all or even many of the factors which create clinical and medicolegal difficulties in connection with them. Instead, the discussion will be focused on occupational poisoning from the inorganic compounds of lead, on the simple principles which should apply in arriving at the diagnosis of the disease for both clinical and medicolegal purposes, and on a few of the deviations from sound clinical thought and practice which seem to be major sources of error and confusion at the present time.

Diagnosis

THE diagnosis of lead intoxication, as we shall deal with it here, is based upon a valid history of significant occupational exposure to lead, on the presence of symptoms strongly suggestive of the effects of absorption of lead, and upon certain physical signs which characterize absorption of lead or intoxication therefrom. It will be noted that this statement puts the em-

From the Kettering Laboratory in the Department of Preventive Medicine and Industrial Health, College of Medicine, University of Cincinnati.

Presented at the Thirty-sixth Annual Meeting of the American Association of Industrial Physicians and Surgeons, Atlantic City, New Jersey, April 25, 1951.

phasis on the actual existence of an intoxication which is to be identified by ordinary clinical means, and makes no reference to any laboratory findings. That such a statement fails to cover the entire diagnostic field, both from the aspect of the more or less chronic clinical manifestations of the disease and also from that of the technical armamentarium that can be brought to bear on its study, must be admitted. It is done deliberately to place the emphasis where it belongs among clinicians. The facts are that so much has been said and written, on the one hand, about the exotic and unusual clinical states that conceivably may result from the absorption of lead, and, on the other, about the diagnostic measures and criteria of the laboratory, that most of our clinicians have lost sight of the disease as it commonly presents itself, and of the basic conditions without which it cannot arise. The clinical diagnosis of lead poisoning, when it occurs, as it does in the very large proportion of all cases, in a more or less acute episode of illness following brief or prolonged exposure to dangerous occupational conditions, is not difficult. The problems we create for ourselves in connection with it arise from inexperience to be sure, but mainly from the assumption of knowledge which we do not possess, and from sheer carelessness in the performance of simple clinical procedures. A survey of the records of cases of actual and alleged lead poisoning that have been in controversy and hence have come up for our review over a period of years has revealed one characteristic which is almost invariable. In most of these cases the patient did not have the benefit of initial careful clinical study. A slapdash history of occupational lead exposure, uncritically and yet dogmatically stated, a fragmentary recital of indefinite symptoms which were not investigated, and a physical examination that yielded only dubious information, together with some, often a multitude, of usually irrelevant, uncritically interpreted laboratory results, completes a document which portrays not a patient's illness but a physician's incompetence.

Clinical laziness and ineptitude are almost equally evident among the physicians in the lead-using industries, who so frequently rely upon non-specific, highly variable and outmoded laboratory procedures to make differential diagnosis of illnesses which can only be made by careful clinical study. It is one thing to apply the procedures of the chemical or clinical laboratory in a routine manner, and, by proxy, to the appraisal of the degree of hazard of an occupation. It is quite another to arrive at the diagnosis when illness occurs in an individual workman. Workmen in the lead trades are among the victims of gastric and duodenal ulcer, of appendicitis, of enterocolitis, and of numerous other gastro-enteric, as well as neurological, diseases. Moreover, cases of lead poisoning may occur as the result of unrecognized and improperly appraised exposure to lead in industrial plants, and, therefore, the diagnostic problem is always an intriguing one from the aspect of the cultivation and application of sound clinical method and judgment. Every case of illness which occurs among workmen exposed to lead should be worked up by the responsible clinician in such manner as to substantiate the diagnosis. If the diagnosis is that of lead intoxication, the records should provide the evidence that will stifle controversy and provide for proper and adequate medical care and for prompt compensation for disability. If it is some other illness, the record should be equally apt and convincing. If this definitive differentiation cannot be made in every case, there are but few exceptions, and there is, at least, no justification for not making an honest and capable attempt to do so. Moreover, in the performance of this professional duty, the physician has a role that is peculiarly his own, involving only the talents and skills which, on the basis of his training, may justly be expected of him, regardless of his experience or inexperience with the more modern techniques of industrial hygiene.

The Occupational History

IT MUST be recognized that the occupational history, as it pertains to the lead trades, is substantially useless, except as a clue which must be substantiated or discarded, unless it is obtained and recorded and interpreted by one who is wholly familiar with the operations in these trades and with the specific plant in which the operations are being carried out. The statements of a patient on these matters, almost without exception, are inacceptable as clinical evidence, and are unreliable in those features which relate to the quantitative appraisal of the exposure, not necessarily, or even commonly, because of the patient's animus or dishonesty, but because of his inability to differentiate the significant from the insignificant facts, even if the physician is capable of such differentiation and of conducting his inquiry along lines that will facilitate such differentiation. There are, however, certain facts which can always be obtained and are highly important in the interpretation of other clinical information. Since exposure to appreciable quantities of lead is a regular and unavoidable experience of all mankind,[1,2,3] the *quantitative* aspects of such exposure constitute the point, virtually the sole point, of the occupational history. The significance of occupational exposure to lead can be solved only in terms of its *duration* and its *intensity*. All questions put to the patient in relation to exposure are for the purpose of appraising these two items.

The Duration of Exposure

HOW long has the patient worked in the job at which he was working when he became ill? How long has he worked at this same job

elsewhere? What changes of occupation have occurred over the years, at what specific dates have they occurred, and what intervals have intervened? One attempts here to find out the *duration* of uninterrupted exposure to conditions quantitatively comparable to those in existence at the time of onset of the illness. If interruptions occurred, what was their duration? Above all, what was the last day on which the patient worked under conditions which involved exposure? The time factor, in relation to exposure, in its every aspect, is of the greatest importance. Without knowledge of this no subsequent information can be adequate.

The Intensity of Exposure

WHAT was the operation (or operations) in which the patient was engaged? What part did the patient take in carrying out this operation? What other operation was carried out near him and how near? What exposure actually occurred (fume, dust, vapor of molten metal (at what temperature))? What precautions, if any (ventilation, local or general, use of respirators, care and supervision of men and equipment, housekeeping and sanitation), were being taken to control the exposure? What steps, if any, were being taken to measure the exposure and to observe the clinical status of the workmen? What does the patient know about cases of poisoning that have occurred recently, or at any other time, among men employed in the same kind of work and at the same job he has been performing?

These and other questions will occur to the experienced physician. If their relevance is not apparent to the novice, he need only recognize thereby that he is a novice, and that he has much to learn. Some degree of humility based on such considerations would represent real progress toward the elimination of the medicolegal controversies that now arise.

The History of the Illness

THE most significant clinical characteristic of lead intoxication, generally, is the preponderance of functional over anatomic abnormality, or, stated otherwise, the greater weight of subjective over objective evidences of illness. The most important approach to the diagnosis, therefore, consists in the careful elicitation of the information about past and present complaints, their onset, their development in relation to exposure or discontinuance of exposure, and their sequence, intensity and validity. With respect to the last of these factors, one must appraise a patient, as well as a disease, and a story which may have been learned rather than experienced in whole or even in part. There is no rule for this procedure, but, by the same token, there is no substitute for careful, critical inquiry into the numerous facets of gastroenteric symptomatology and dysfunction, and for objective appraisal of the results of such inquiry. Strangely enough, the mere mention of an opportunity for occupational exposure to lead seems frequently to be the signal for dispensing with the careful inquiry that is so well recognized as being necessary for the diagnosis of other abdominal complaints, and the glib decision is made that the patient is suffering from lead colic.

There is a highly uncritical attitude of mind to the effect that any doctor knows all about lead colic and can recognize the characteristic pattern of the syndrome without difficulty. The facts are more nearly the exact opposite, in that this, among the many and more common abdominal diseases, is one of which doctors, generally, are unlikely to have knowledge and experience.

The Physical Findings

IN THE most frequent type of lead poisoning, especially in the first episode of intoxication experienced by the individual being examined, the physical findings will be scanty. The evident postural and autonomic nervous signs of abdominal pain exhibit themselves in varying degrees of severity, including those which characterize excruciating agony, subsiding somewhat and then recurring in association with abdominal rigidity or intestinal spasm. The absence of fever, the scanty evidence of abdominal disease in the intervals between bouts of severe colic, and the lack of rebound (peritoneal) pain, suggest functional disorder rather than organic disease, and if there is the blue or black punctate line of sulfide deposit in a gingival margin, in association with a characteristic history of recent weight loss, morning anorexia and constipation, the diagnosis can reasonably be made. Enough has been said elsewhere about the characteristics of the so-called lead line to inspire caution in its recognition.[4] Suffice it here to say that one should know whereof he sees and speaks before accepting any one of several abnormalities of the teeth and gums as being a "lead line." Experience is required to find and interpret this lesion, and errors of omission and commission in this relationship are all too frequent.

Especially in cases involving prolonged occupational exposure attended by prior recurrent mild or severe symptoms, evidences of neuromuscular disorders are likely to be found, of which well-defined weakness of the extensor muscles of the fingers, wrist and forearm on the most-used side, or on both sides, is much the most common. Frank palsy, with wrist drop, is most rare, if it occurs at all, in an initial bout of lead intoxication, this lesion being an expression of prolonged intense exposure to lead, in the course of which other manifestations of intoxication have usually occurred from time to time. Earlier signs of neuromuscular involvement, that may go hand in hand with extensor weakness in the upper extremities, are abnormalities of muscle tone, associated with hyper-

reflexia, hypersensitivity of muscles to mechanical stimulation, and maintained muscular contractions. These may involve the lower extremities and, when they do, there are complaints, commonly, of myalgia and arthralgia.

The interpretation of the rarer clinical types of lead poisoning is more difficult and requires careful and critical study of the patient and his exposure. Full coverage of these problems is beyond the scope of this discussion. Perhaps the most valuable advice that could be given in connection with them is that one should proceed slowly, gathering all of the facts, before reaching or expressing a conclusion from which it is difficult and often embarrassing to deviate later. Modern medicolegal procedure is such that reasonable proof of the existence of occupational disease is or should be required. This includes proof that lead has actually been absorbed in quantities compatible with serious manifestations of the disease.

The Clinical Course

ONE of the commonest of clinical mistakes in the diagnosis of occupational lead poisoning stems from the belief of inexperienced clinicians that recovery from lead poisoning is usually slow, and often, if not regularly, incomplete. The facts are precisely opposite. Lead intoxication, except in its more severe and uncommon paralytic and encephalopathic manifestations is an essentially self-limited disease, of comparatively short duration (day to weeks), from which, in the overwhelming proportion of cases, there is complete recovery when the exposure has been terminated. The persistence of abdominal symptoms for many months or even for years after the cessation of exposure, as has been the case not infrequently in controversial situations, represents practically indubitable evidence that the cause of the ailment was not lead absorption. Even an anemia, originally considered to be an expression of the toxic effects of lead absorption, is to be regarded with the greatest skepticism, if it persists indefinitely after the termination of exposure to lead. So far as can be determined by the study of numerous cases of lead intoxication, no irreversible damage to the blood-forming tissues is associated with plumbism. Indeed anemia is not a necessary accompaniment of lead intoxication, and now when legal procedures and current measures of industrial hygiene are reducing the severity of occupational lead poisoning and the likelihood of recurrent and repetitious lead poisoning in the same individual, anemia is a much less important component of the clinical syndrome than it was formerly. Lead poisoning, as seen in the trades which are concerned with inorganic compounds of lead, when recognized promptly and dealt with realistically by removing the individual from exposure and permitting his return to his job only when the exposure has been brought under adequate control, is only rarely a serious disease. Our contrary clinical attitude toward this disease stems largely from earlier clinical descriptions of a neglected disease, which, when it finally came to the attention of a competent clinician, was the expression of an exposure to large quantities of lead over a long period during which there have been recurrent mild or moderately severe episodes of intoxication with brief periods of partial disability. This recurrent, ostensibly mild, but progressively disabling, form of the disease, existent over a period of years of continued exposure to lead, is the so-called "chronic lead poisoning," sometimes in its milder forms misleadingly called "lead absorption," which is so commonly described in medical literature. It is not altogether gone from the American scene, but certainly it is less frequent than it was formerly, being the product, at present, of obviously backward or unduly complacent industrial policy, or of poor industrial medical and hygienic practice.

The Contribution of the Laboratory

COMMENT has been made previously on some of the diagnostic difficulties of the physician engaged in general practice. From the aspect of the laboratory procedures which have come to be almost indispensable features of the diagnosis of lead poisoning for medicolegal purposes, the problem is especially difficult. Few diagnostic laboratories available to such physicians, and, for that matter, few of those available in hospitals and medical centers, generally, are equipped with facilities for the performance of the necessary tests, or with the knowledge and experience required for giving adequate advice on the tests that should be performed, or on the methods required for obtaining materials to be examined. The result is that the tests made in many laboratories are more likely to be misleading than helpful. Therefore the physician will be well advised to dispense with them and to base his judgment entirely on the history of the illness and on the physical signs which he can observe, unless he has the knowledge and experience that enable him to appraise the laboratory and its results.

X-ray examinations in relation to occupational lead poisoning, except in the differential diagnosis of a gastro-enteric disorder, may be dealt with summarily, by pointing out that they have no value as diagnostic procedures in the adult. One is embarrassed not infrequently in medicolegal circles, by the necessity of pointing out that the line of abnormally dense bone which is found from time to time at the margins of rapid growth in the bones of infants and small children, is not a specific result of lead absorption, on the one hand, nor a phenomenon of adult life, on the other.

We may also deal briefly with certain of the more common laboratory procedures. The hematologic changes commonly associated with lead poisoning play an important role in clinical

diagnosis. The interpretation of the entire blood picture, however, must be made in the full recognition of the fact that all of it is important but that no feature of it gives specific evidence of lead absorption. The commonest fallacy in this connection is the persistent belief that basophilic stippling is indicative of abnormal absorption of lead or of actual lead intoxication. Much could be said of the methods of examination of the blood in this connection, but, without entering upon such a discussion, let it merely be recorded here, regardless of method, that the occurrence of basophilic material in the erythrocytes, per se, has no diagnostic significance, and that there must be some quantitative expression of the extent of this phenomenon in the blood to give it significance. First, one must establish whether or not the phenomenon occurs beyond the physiologic range, and then determine, if possible, the most probable cause of the abnormality, if such is found. Lead absorption is only one, and not the most frequent, of the possible factors. The greatest value of this laboratory test, when properly performed, lies in the fact that failure to detect any abnormality of the blood in this respect argues strongly, indeed, against the likelihood that the illness under consideration is the result of the absorption of inorganic compounds of lead.

Another procedure of the laboratory, around which an excess of enthusiasm has gathered recently, is that of the determination of coproporphyrins in the urine, as a means of demonstrating the occurrence of hazardous absorption of lead. Careful investigation of the metabolism and excretion of the porphyrins under a variety of conditions, including those associated with varying levels of lead absorption, may provide a means for the early detection of actual or impending lead intoxication, and thus add materially to the armamentarium of industrial medicine in the lead trades. Moreover, if the excretion of porphyrins, in the course of a recognized case of lead poisoning, can reveal the severity of the intoxication and give aid in prognosis, it will come to serve a useful purpose. There can be little doubt, however, that the current popularity of the procedure stems largely from the desire of clinical and laboratory workers to substitute some simple diagnostic test for the more precise and therefore more difficult analytical methods that relate specifically to the concentrations of lead in the urine, blood or tissues of persons suspected of being victims of lead intoxication. Let us consider briefly what is likely to be lost by a too enthusiastic yielding to this understandable desire. Quite apart from the methods of analysis of the porphyrins, which while simple are far from foolproof, and with only passing regard for the necessity of preserving the urine against significant increases and decreases in its coproporphyrin content on standing under varying conditions of light, temperature and reaction, we are dealing with a physiologic and pathologic phenomenon of considerable variability, the extent of which has not been established comprehensively in varying states of health and disease, or in relation to age and sex. Certain it is, that this phenomenon is not specifically related to lead absorption, being influenced markedly by liver damage or disease, by intoxications of other types than lead, by a number of infectious diseases, by certain deficiency diseases, and by certain hematopoietic disorders.[5,6,7] That there is an elevation of the rate of urinary excretion of coproporphyrins, in association, more or less regularly, with highly abnormal absorption of lead, is an interesting and important physiologic fact, and that this phenomenon may well be an highly significant aspect of the mechanism of lead intoxication, goes without argument. But that this non-specific phenomenon can contribute an answer to the primary diagnostic question with which the physician is faced seems most improbable. What is this question? If we can make this sufficiently clear for both clinical and medicolegal purposes, we shall by that means define the issue sharply. Medical, legal and economic considerations require and justify a decisive answer to the question: has this patient absorbed a quantity of lead sufficient to cause intoxication? If he has absorbed such quantities of lead, the diagnosis of lead intoxication, arrived at by sound clinical means, may be regarded as adequately substantiated. If he has not, the diagnosis is untenable, and further study of the case is required to arrive at the correct diagnosis.

This brings us naturally to the consideration of the procedures of the laboratory whereby the extent and significance of the lead absorption of the patient can be appraised. The physiologic evidence on which the choice and interpretation of these procedures are based is available[3,8,9] and need not be brought into this discussion, although such evidence must be understood fully by those who would apply it. The methods of sampling and analysis[10,11] also have been described in sufficient detail and will not be mentioned, beyond a further warning that there are adequate and inadequate methods and that an high degree of knowledge and skill, far beyond that of the usual type of laboratory technician, is required for the performance of the work.

The concentration of lead in the blood of the person who is suffering from symptoms believed to be those of intoxication by the inorganic compounds* of lead is the most important single bit of evidence required to portray the significance of his absorption of lead. Since the concentration of lead in the blood varies only within extremely narrow limits from hour to hour and from day to day, except under conditions involving concurrent and highly variable exposure

*The concentration of lead in the blood following absorption of tetraethyl lead undergoes little increase, whereas the urinary lead concentration is greatly elevated.

to lead, or in response to the administration of dithiopropanol,[12] only one determination would be required for diagnostic purposes, were it not for the possibility of the contamination of a sample of blood with minute quantities of lead in the processes of its withdrawal and analysis. Because of these possibilities it is advisable, even under the best of conditions, to obtain multiple samples, at least in duplicate, and to submit them to separate analysis. The results should check within the very narrow limits of a few micrograms, when expressed in terms of 100 grams of whole blood, if they are to be accepted as reliable.

The determination of the rate of the urinary excretion of lead, when properly carried out, provides specific and invaluable information on the extent and significance of the lead absorption of an individual, and therefore the choice of materials for analysis, in medicolegal cases especially, includes suitable samples of urine. The simplest combination of materials for diagnostic purposes, and one which will serve to eliminate most of the errors of sampling and interpretation, constitutes duplicate samples of blood taken in special equipment by an instructed person, and one or more "spot" samples of urine, each voided directly into the container specifically provided for the purpose under the critical eye of an instructed person. Analytic and physiologic concurrence on the part of these results will stamp them as valid, while variation among them beyond the known ranges of analytic precision or physiologic limitation creates the demand for further investigation.

Any standards adopted or employed for the interpretation of the analytic results must be based upon the known precision of the analytic method or methods employed. Methods of analysis now available will yield results that err on either side within the range of greatest physiologic significance by no more than 10% ordinarily and by no more than 15% at the maximum. So long as reproducible results of known accuracy can be obtained by the method employed, a somewhat larger margin of error can be tolerated, but it is necessary to recognize that the extent of the potential error of the method will determine the precision of the threshold which separates safe from dangerous levels of lead concentration, especially in the blood. For example, the concentration of lead rarely exceeds 60 micrograms per 100 grams in the whole blood of persons who have suffered no recent unusual exposure to lead, but persons who have 80 micrograms or more of lead per 100 grams have been exposed to lead to such an extent that they may have mild symptoms of intoxication. The significance of an analytic error of ± 15% in dealing with a sample of 10 grams of blood, looms rather large, therefore. It is in the consideration of such potential errors, that duplicate analyses are helpful, and that the great significance of the rate of the urinary excretion of lead, despite its greater physiologic variability, comes into play. On the other hand, it is because of the great physiologic variability in the urinary response to lead absorption, plus the fact that the renal excretion of lead is seriously impaired occasionally, that the analysis of the blood is so necessary.

The concept that the necessities of diagnosis call for the analysis of a sample of urine of large volume, such as that obtained over the period of 24 hours or longer, has been dislodged by the availability of analytic methods which provide for the accurate analysis of small samples of blood, and also by the determination of the range of variability of the concentration of lead in small samples of urine under varying conditions of human lead absorption. This is not to say that the analysis of samples of urine of large volume is undesirable, but rather that in some instances, and in many medicolegal situations, it is difficult or impossible to accomplish. The difficulty of obtaining uncontaminated samples of urine of large volume for analysis can be obviated through the use of small samples voided in the presence of the examiner, and at the same time, the misleading effects of the physiologic and pathologic variations in the urinary excretion of lead can be avoided by obtaining and analyzing samples of blood.

It sometimes happens that the diagnosis of lead poisoning is in doubt at the time of the death of the patient. The problem of diagnosis postmortem is not easy, except as it may be made in the negative. Analysis of suitable tissues will serve to determine whether or not there has been potentially dangerous absorption of lead, and, if no such absorption occurred, the diagnosis of fatal or contributory plumbism must be discarded. On the other hand, if the clinical study of the living patient has not yielded information on which to base a diagnosis, it is unlikely that evidence of lead absorption obtained postmortem can justify the diagnosis of fatal lead intoxication, unless further investigation discloses previously unrevealed or misinterpreted facts bearing on the occupational and clinical history of the deceased. This follows from the fact that there is no specific pathologic entity characteristic of lead poisoning and that the diagnosis of lead poisoning cannot be made on evidence of lead absorption alone but on the clinical characteristics of the disease.

For the appraisal of the extent of the absorption of lead on the part of a deceased person, one should not be content with the analysis of one or two tissues. It is advisable to find out the pattern of the distribution of lead in the principal organs and tissues, such as the liver, kidneys, spleen, striated muscle and skeleton. Blood, and urine from the bladder, should be obtained for analysis when these are available. The retention of lead in the lungs is important in relation to a recent history of occupational

exposure, and the concentration of lead in the brain is a matter of great importance in the differential diagnosis of a fatal disease involving the brain. It is difficult in most instances to obtain a specimen of long bone for analysis. Fortunately, the analysis of rib serves the purpose adequately, and bone from this source is always procurable. Meticulous care in the collection of samples of tissue for analysis is required, not only to avoid their contamination but to ensure their representative character. Calculation, based on the distribution of lead in the principal tissues of the body, will yield information, which when compared with normal values and those found and recorded, in association with known types and intensities of exposure, will portray the facts as to exposure in a definitive manner.

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"A Double Layer of Dressing"

IN DIAGNOSIS as well as treatment we attach as much importance to the employee's mental attitude as his physical symptoms, and in doing so we find we cannot handle the thorny subject of medical certification through consideration of physical symptoms only. Adaptability, will-power, social needs, environmental factors, in fact all influences that can affect an individual as a whole, have to be considered. A certificate becomes mechanical instead of medical if it bases its findings only on the physical needs of a part of the patient's body. Our technical knowledge may inform us that an injured finger must be put at complete rest, but the patient may plead that his children will starve if he keeps away from work. In such cases we sometimes feel justified in issuing a fit certificate, but after taking the precaution to immobilize the injured part as well as we can without making it impossible for him to carry on with his work. If he has a dirty job to do and there is a risk of sepsis through it, we give a double layer of dressing and remove the outer layer as often as necessary. Such compromises, we find, enable us to obtain his ready compliance to our wishes in real emergencies. The process of healing depends far more on the inner forces like the phagocytic action of blood corpuscles and the stimulating hormones of internal secretions than on outside agencies like antiseptics and drugs. The doctor's approach towards the certification problems can become the deciding factor whether the inner forces are allowed full play or are frozen. No rule of thumb can serve this purpose .... The success of mass production depends as much on employee satisfaction as on technical progress, and the doctor's approach to certification can develop goodwill or destroy it. He has, of course, to write certificates in the ink of medical ethics, but with a humanized pen.

—From "An Industrial Health Programme," by DR. H. P. DASTUR, Medical Officer, Tata Industries Ltd., Bombay, India, in *Proceedings of the Society for the Study of Industrial Medicine*, March, 1951.

The Treatment of Open Fractures of the Hand

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OPEN fractures of the hand are most often seen as complications of crushing injuries and the surgeon has to deal with several problems which are often difficult of solution. Reduction of the fracture must usually be accomplished at first instance if satisfactory reduction is to be accomplished at all. Damage to covering tissues may be very severe; there may be actual loss of large areas of skin or such severe crushing of the skin that wide excision is required, often uncovering the actual site of fractures. Comminution of fragments and involvement of joints may lead to apparently hopeless damage and tempt the surgeon to the sacrifice of digits which could be restored at least to partial function. Associated nerve and tendon damage may further complicate the picture and either lead the surgeon to extensive, ill-advised primary deep soft tissue repair or to a too pessimistic attitude toward eventual restoration.

I should like to discuss these severe crushing wounds with open fractures, and to present an approach to their care which has seemed logical. I do not propose to present a resume of all the various methods of caring for open fractures of the hand but to present a method applicable to the majority and which will form a basis upon which logical treatment may be developed.

The basic features of this care have been discussed so often that one is hesitant to discuss them further in extenso. Reduced to the barest outline they are (1) initial and continuous protection of the wound from further injury and contamination; (2) mechanical cleansing of the wound with soap and water; (3) removal of dead and devitalized tissues; (4) repair of tissue damage as far as consonant with its nature and extent; (5) closure of the wound with skin by suture or graft, or both; (6) reduction of the fracture by molding over a splint in the position of function; (7) application of a voluminous compression dressing.

It is not necessary to discuss each principle extensively. The need for immediate covering of an open injury and the application of a splint, particularly for severe wounds and those associated with fractures, are well recognized principles of first-aid.

Cleansing of the wound—mechanical cleansing and liberal irrigation and the avoidance of all antiseptics on the injured tissues—is a principle which has passed successfully through the crucible of a world war.

The excision of devitalized tissue likewise is applied to wounds with open fractures as well as to any other wounds. There are, however, certain features of crushing wounds associated with fractures which deserve more than passing comment. The presence of fractures adds not only the need for considering removal of bone fragments and decision regarding viability of bone, but there is also the fact that extensive skin excision may render extremely difficult the covering of fracture sites. Bone fragments are carefully considered before any removal is accomplished. If there is any soft tissue connection at all, bone fragments are probably viable and are not removed unless other circumstances so dictate. The surgeon must remember also that the bones of the hand are small bones and that what would be a tiny and insignificant fragment in case of radius or humerus or tibia may be a most vital segment of a metacarpal or phalanx. These small fragments, often measurable in millimeters, may be molded into position, maintain length and re-establish continuity. The fragments are especially important about the joints. We have on a number of occasions succeeded in remodeling a joint and restoring it to some, if not perfect, function by careful realignment of fragments.

The question of removal of devitalized skin may be a discouraging problem. The crushing wound without bone damage frequently presents the need for excision of sizeable flaps of skin with resultant raw surfaces which require skin grafts and various maneuvers to close. The problem is further complicated if removal of skin flaps uncovers the site of fractures, especially if these are severely comminuted. Each case is a problem in itself. It is of course imperative that dead tissue be removed; the game is pretty well lost if the skin overlying a fracture site sloughs out; the underlying bone is almost certain to become involved and die. Various procedures are available to the surgeon for covering exposed bones and fracture sites. If the periosteum is intact or if neighboring soft tissues can be shifted across the bone a split graft may be applied with good assurance of a take. In many cases it is possible to shift or rotate a flap of skin from one side or the other over the bone, and then to cover the flap defect with a split graft. Flaps of skin from irreparably damaged fingers should be saved until the end of the operation because they may be utilized in closure. As last resort the surgeon may place the hand under a flap or in a pocket. When this latter procedure is done, however, it is seldom possible to maintain reduction of fractures.

The principle of tissue excision of course extends to the amputation of irreparably dam-

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aged fingers. The only absolute indication for amputation is complete lack of blood supply. This may not always be as easily demonstrated as one would think. We have found it helpful to defer the removal of questionable digits until all other excision has been accomplished. The blood pressure cuff, which has maintained a bloodless field is then released and then one observes the return of blood into the questionable fingers. The reactive hyperemia which follows release of the cuff will often open up channels which may have been closed previously. The fingers and remaining skin flaps are observed for return of circulation. Often we are agreeably surprised by the good vascular supply of supposedly avascular parts. Fingers should seldom be amputated primarily because it seems impossible to restore them to eventual function. No rigid rules, however, can be laid down. The thumb, of course, one struggles to save even if it is obvious that all joints will be ankylosed. In this connection it may be mentioned that the thumb has an exceptionally good and a very well protected blood supply. This digit may be almost completely detached, and hanging only by a bridge of skin springing from the first interosseus space. This bridge in most cases will be found to contain the princeps pollicis artery.

Whether or not to amputate other digits than the thumb because of impossibility of functional restoration will depend, first, on the extent of damage and, second, upon the condition of the other fingers. With all four fingers severely damaged and probably difficult of any functional repair the surgeon is faced with a difficult choice. If they are all viable the choice will be to save all and to give the patient the trial of labor afterwards, and amputate later if necessary. If one or two fingers have been removed by the injury or must be amputated because of circulatory loss the surgeon will bend every effort to save the remaining ones even though their ultimate function obviously will be poor.

No one criticizes the surgeon who removes a finger which can be saved only by great effort and which will obviously be useless, or an actual handicap. However, it is not always easy to decide if a finger will, in fact, be useless. This is often a decision which only the patient himself can make after he has started to use it.

The repair of divided nerves and tendons is likewise a matter of surgical judgment. The extensor tendons may be repaired occasionally over the dorsal surface of the fingers, even in the presence of open fractures with some hope of success, although the position in which the fractures are reduced is not a favorable one for the tendon suture. It is only on the rarest occasion that the surgeon is justified in attempting the repair of the flexor tendons in the presence of open fractures. The tissues of the hand are often so badly crushed that the wide exposure and accessory incisions required to expose and suture tendons may add too much further trauma. The tendons themselves are usually crushed and frayed so that even if repaired they will heal with excessive callus. The healing fracture will probably become adherent to the healing tendon so that repair will often be fruitless. Each case will have to be decided upon its own merits, with the indications more against than for primary tendon repair.

Nerve repair should be undertaken at primary operation if at all feasible. The nerves involved are usually the digital nerves, and unless there has been actual loss of substance suture is usually possible.

The nerve stumps of amputated digits should be drawn out and divided high up so that the ends will come to lie well up in soft tissue, so as to avoid the formation of a neuroma and a tender painful stump. This simple method of dealing with the nerve end seems superior to other more complicated procedures.

The fractures themselves in these severe injuries we prefer to manage by simply molding them into reduction on a splint in the position of function. Much of this molding is accomplished with the hand already laid out on the splint. The palmar wounds are closed and the hand placed on the splint in the position of function. Gross carpal, metacarpal and phalangeal displacements are reduced and then by a combination of pull on the digits and digital pressure the fractures are gently reduced and held in place until the compression dressing can be applied.

Often at this stage it is necessary to complete the closure of the dorsal wound by means of suturing and split grafts. With the hand firmly supported this is quite easily accomplished and the solid resilient support makes possible the application of pressure dressings so valuable in the management of these injuries.

In dealing with fractures about the joints the surgeon will frequently find it possible to secure reposition of fragments and restitution of the joint to some semblance of functional potentialities by this molding procedure. The position of slight flexion in which the joint is maintained while being molded is of course the most satisfactory one in which to immobilize, even if an ankylosis should occur.

Fractures with many fragments are often difficult to realign. We have found that closure of soft tissues first provides a containing membrane in which the various fragments may be manipulated into position and with the part held firmly on a splint the reduction may be maintained until a retaining compression dressing has been applied.

The final stage of the operation is the application of a voluminous compression dressing. This dressing must be firm, evenly applied and resilient, not tight or constrictive. A certain amount of swelling is bound to occur after operation; the dressing will help to minimize it but the dressing must not be unyielding. The

Fig. 1.

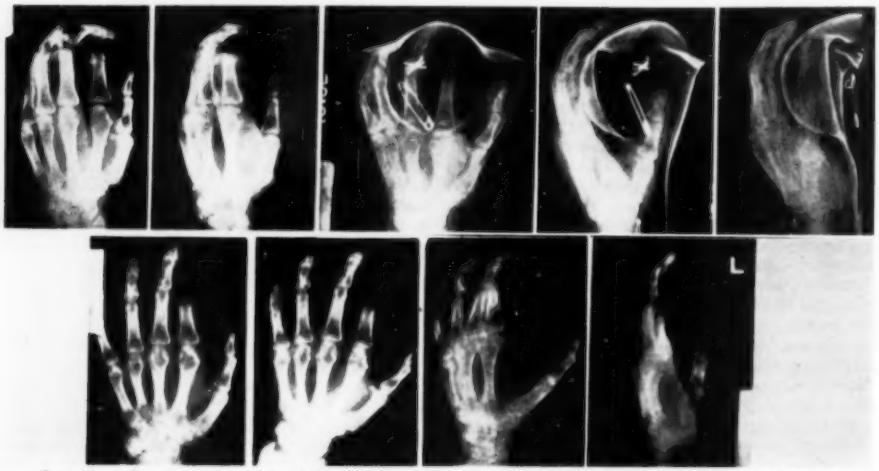
Case No. 1. Circular saw injury with resultant amputation of index and almost complete amputation of middle and ring fingers. The initial appearance of the hand is shown in the upper row of photographs and the functional restoration at 3½ months in the lower two rows of photographs.

fault in application of the dressing lies too often in insufficient resilient material (fluffed gauze, cotton waste or if one prefers it, foam rubber). The ordinary woven elastic bandage does not in itself afford sufficient resiliency. Besides helping to reduce edema and swelling, the compression dressing favors return of venous flow. This is extremely important since venous blockage leads to tissue death just as surely as does arterial blockage. As a matter of fact digits and skin flaps which appear viable at operation and die subsequently do so more often from interference with return than from actual lack of arterial inflow.

In these crushing injuries with widespread tissue damage which is sure to be followed by fibrosis and scarring every effort of the surgeon must be directed toward early healing with acceptable fracture reduction, minimal postoperative swelling and bleeding, and a hand in the position of function when healing is complete. This can be secured by prompt carrying out of the steps just outlined: cleansing and excision, closure of wounds by suture or graft, molding of the fractures into reduction over a splint in the position of function and the application of a firm resilient pressure dressing.

Illustrative Cases

MR. M. M. was injured by a circular saw November 13, 1948, and was brought to Passavant Memorial Hospital about an hour later with a large sterile dressing over the hand (Fig. 1). The index finger was found to have been completely amputated. The middle finger was almost completely amputated through the proximal interphalangeal joint, but was left hanging by a bridge of skin along its radial



Case No. 1. Roentgenograms of hand shown in Fig. 1. The pre-operative films show the open fragmented fractures of the middle and ring fingers. These fractures are shown reduced on the Universal Hand Splint. The x-rays in the lower row, taken 3½ months later, show the satisfactory healing.

Fig. 3.

Case No. 2. Crushing and avulsing wound of the left hand with open fracture of proximal phalanx of the thumb. Extensive excision of devitalized skin was required as shown in upper row of figures. Hand was immobilized on splint in the position of function under a large compression dressing. Follow-up at seven months is shown in lower row of pictures.

side containing the neurovascular bundle. The ring finger had suffered an almost similar injury, but by some fortuitous circumstance both neurovascular bundles were intact. A minimum of excision was required. Nerve and tendon repair was accomplished and both ring and middle fingers were closed by suture primarily. The hand was then laid over a cup-shaped aluminum hand splint and the fractured phalanges and disrupted joints were molded into reduction (Fig. 2), and a voluminous pressure dressing was applied. Healing occurred per primum, and a satisfactory functional result was secured.

MR. G. T. (Fig. 3) caught his left hand between a belt and pulley, sustaining a severe avulsing wound of the dorsum of the hand with open fracture of the proximal phalanx of the thumb. The extensor tendons to ring and middle fingers were badly torn and frayed, the metacarpophalangeal joint to the index was opened and the extensor tendon over it was torn. It was necessary to remove a large flap of badly crushed and devitalized skin from the dorsum of the hand extending as a half moon-shaped segment from

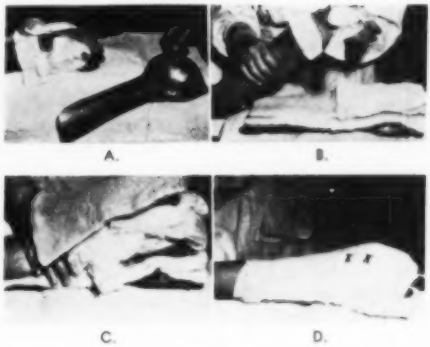


Fig. 4.

Method of application of compression dressing with hand immobilized in the position of function. A. Dressings are applied to the hand being sure that the fingers are separated by gauze to prevent maceration. B. The splint shaped to hold the hand in the position of function is covered with abdominal pads. C. The hand is laid on the splint and over it are laid many layers of fluffed gauze and abdominal pads. D. This voluminous dressing is bandaged on firmly and evenly after the hand has been molded into the position of function with fractures reduced.

the proximal phalanx of the ring finger across to the distal phalanx of the thumb. The fracture site of the proximal phalanx of the thumb was covered by areolar tissue before laying the graft over it. Joint capsule and extensor tendon repair was accomplished and these sites of repair were likewise covered with areolar tissue. A split skin graft was excised from the thigh and laid over the raw surface, and held in place by a large gauze stent-like dressing held in place by silk sutures attached about the borders of the graft and tied over the gauze to maintain pressure. This dressing and the extent of the graft are shown in Fig. 3. Healing occurred by primary intention, and the phalangeal fracture healed satisfactorily.

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Medical Testimony from an Attorney's Standpoint

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MEMBERS of the medical profession have achieved an increased importance in the courtroom. Litigated cases concerning personal injuries, and alleged occupational diseases, have grown in numbers and importance under the conditions of modern life. Physicians are necessary and indispensable witnesses in developing the evidence concerning these cases. Their responsibilities, as well as those of the lawyers, are indeed great.

In assessing such responsibilities, it will be well to remind ourselves of the reason for a law suit. Fundamentally, it is the method evolved by organized society for the purpose of administering justice among citizens according to rules of law recognized as just and equitable. Our courts are the most important part of our civilized government. They protect our property, our means of happiness, and our lives. Whenever we step into a courtroom, we should be mindful of its high purpose, and our demeanor should be in keeping with its function.

Too often we lose sight of these important fundamentals. Lawyers are likely to forget their duties as officers of the court and resort to tactics of the prize fight or the wrestling match, expecting the judge to do nothing but act as a referee. The trial of a law suit is not primarily a battle of wits—it is a seeking of truth so that justice may be done. While the lawyer owes a duty to his client to see that the facts favorable to his cause are presented, and that the court properly understands the law applicable to the case, he has a higher duty to the court to see that the facts are truthfully presented and that the judge and jury are not misled.

THE duty of the physician, when called as a witness, is equally exacting, and is, indeed, peculiar. He is called upon to testify not only to the medical facts within his knowledge, from observation, but also as to his opinion as an expert concerning the effect and significance of such facts. As an expert, he is expected to help the hearing agency interpret and understand the medical facts developed by the testimony and to reach a proper and correct conclusion from such facts. As such expert witness, he must not be an advocate, zealous to help one side to win; rather he should and must be like a judge, weighing the facts carefully and impartially and giving his conscientious opinion concerning their effect or consequences. Whenever the medical witness abandons the impartial attitude of the expert, and assumes the position of a partisan, he not only stultifies himself but loses his value as an expert.

While personal injury cases and claims for compensation and occupational diseases fill the courts' and Industrial Commissions' dockets, they constitute a small percentage of such matters coming to the attention of physicians and attorneys. A large percentage are adjusted and settled without a suit or a claim being filed in court or before the Commissions. The responsibility the physician has in such cases is no less than his responsibility as a witness.

The physician's primary duty, of course, is to rehabilitate the injured person and restore him promptly to his place in society as a useful citizen. No physician worthy of his profession would prolong a disability or increase an impairment for the purpose of aiding his patient pad his claim for damages. Of course, the claim which the injured person is asserting is a matter of great importance to the patient, and the attending physician cannot and should not ignore it. The physician's duty in that regard is clear and definite. He should be frank and fair in advising his patient exactly as to the nature of his injuries or disability, and the probable consequences. He should neither exaggerate nor minimize. The patient is entitled to the physician's best judgment in that regard, but there the physician's duty stops. The physician who goes beyond that point and tries to advise his patient as to what damages or compensation benefits he should receive, or whether he should settle or litigate, is assuming a responsibility beyond his profession, which is unwarranted, unjustified, and often harmful to the best interests of his patient. I am glad to say that according to my own observation it is seldom that an attending physician oversteps the bounds in this connection. Usually he concerns himself with curing the patient, and leaves the question of adjustment, settlement, and litigation to other hands.

GENERALLY speaking, the cases involving personal injury and damage to health can be classified as follows:

1. Negligence cases, such as automobile accidents, accidents in business operations, and accidents occurring on premises.

2. Claims against dealers or manufacturers because of injury from the use of foods, cosmetics, wearing apparel and other products bought from such dealer or produced by such manufacturer.

3. Claims against physicians for malpractice.

4. Claims on insurance contracts.

5. Claims for compensation by employees

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against their employers under the provisions of the workmen's compensation and occupational diseases acts.

The last mentioned group greatly outnumbers the first four mentioned. This is true not only in Indiana but in all other states and our possessions, except two states which do not have certain compensation laws. Although the benefits differ, the theory behind the law is fundamentally the same. In each of the states and possessions having the laws, the administration of them is by Industrial Boards or Commissions. The cases are tried in Indiana in the county of the occurrence of the accident, by members of the Board or Commission who travel to such county at designated periods, usually once a month.

Because litigation of industrial cases far outnumbers the others, the remainder of this discussion will be confined to this phase of medico-legal problems.

IN INDIANA alone, it is estimated that during the course of a year the Industrial Board hears approximately 2,000 cases, most of which involve medical questions, and therefore necessitate medical testimony. Because of their experience gained from the trial of so many cases, our Board members and Industrial Commissioners throughout the country acquire a good general medical knowledge, and, according to a number of the leading men of the medical profession, their awards indicate an ability to segregate the good medical findings and opinions from the bad. In cases where there is a division among the physicians testifying, both as to diagnosis and amount of disability, the Board frequently appoints disinterested examiners in an effort to arrive at a correct answer. It is not often, therefore, that justice miscarries in cases heard by the Board, notwithstanding the many difficult medical problems that are presented for determination.

Even though the underlying theory behind the workmen's compensation and occupational diseases laws is to compensate workmen for accidental injuries and occupational diseases proximately flowing from their employment, many attempts have been made and are still being made to collect benefits for plain, ordinary health ailments, such as various abnormal heart conditions, appendicitis, kidney disturbances, peptic ulcers, tuberculosis, pneumonia, impairment of sight or hearing not connected with trauma or occupation, multiple sclerosis, paralysis agitans, cancer, and leukemia. The medico-legal problem in these cases is not too difficult because one does not usually encounter reputable physicians and lawyers abetting such cases. Usually, they are supported by practitioners with questionable standing, and it is my observation that the leading medical men in their respective specialties are more than generous in their aid to defeat such cases, thereby keeping the generally accepted scientific medical facts and opinions respected and on the high plane on which they belong.

TO MY mind the most important features of the compensation laws are the medical provisions. Indiana and most other states oblige the employer to furnish and pay for the medical attention. Three or four states permit the injured to select his own physician. In this respect I disagree with most of the men with whom I have associated during my life—the workers. The active spirits among this grouping are opposed to the selection of the physician being left to the employer, and insist that the injured workman should have the right to choose his own physician. On the surface this appears fair and reasonable. However, if rehabilitation is one of the desired objects, it would seem that the employer, who has to bear the expenses in the first instance, would be more interested in seeing that one qualified for the particular task at hand would be selected. It is no disparagement of the mine run of medical men to say that some are better adapted for certain work any more than to say that certain lawyers are better equipped for varying phases of legal work. Our family physician is all that we want him to be; but I doubt, if occasion should arise necessitating a highly specialized surgical procedure, that this physician in whom we have all confidence would take over the operation.

Much of the opposition to this selection of physicians runs to the hearing of contested cases, it being contended that the injured man is at a disadvantage in that the attending physician is always found testifying for the defendant. This is more apparent than real. There can be no dispute that the defendant does have, as a rule, the physician who has attended the employee; and it likewise is true that the evidence submitted is generally favorable to the defendant's contention. Generally, I do not believe that the physician goes before the Board or Commission to *testify for* the defendant. I rather think he is there to tell what he knows of the case. If this is not so, then it must likewise be true that the physician for the plaintiff goes before the Board or Commission, not to tell what he knows, but to testify for the plaintiff. In either event, if such be the disposition of the physician, this can be of no benefit to the Board or Commission in arriving at a righteous conclusion. My own opinion, based upon observation of thousands of contested cases, is that the physician is honest. There have been some instances in which one's trusting disposition was shattered, but these have been so few that the net result still has been on the side of good ethics.

In the past two years or so complaint has been made on behalf of some injured workmen of their inability to obtain medical testimony, and inability to get the injured's examining physi-

cian in the courtroom to testify. These complaints stemmed primarily from labor union leaders or union attorneys. Such attacks, in my opinion, are utterly without foundation. Investigation has revealed the following:

1. In some cases, the examining physician, after careful and conscientious examination, has found the claim being urged to be without foundation.

2. In other cases, the injured's physician is found not to have received notice of the hearing until the evening before, or in many cases, the morning of the trial. Obviously, he has been unable to leave his practice, and his attendance is impossible on such short notice. In these cases the Boards or Commissions are consistently liberal in granting the injured continuances. In both instances, the fault lies with the attorney and not with the physician.

SUMMARY: (1) Physicians owe to their injured patients the responsibility of appearing as witnesses to testify regarding the medical facts of the injury and its probable consequences. This responsibility is no less than the actual care.

2. Courts and Boards and Commissions cannot function properly in compensation cases without the appearances of physicians as witnesses.

3. Physicians generally are faithful to this trust.

4. Generally speaking, the testimony of medical practitioners is fair, honest, and scientifically sound.

5. If some injured workmen encounter difficulty in getting physicians to attend litigated proceedings, the fault lies with their attorneys and not with the physicians.

(4415 N. Illinois St.)

Opportunity

MANAGEMENT seems blind to the fact that it is the only active force operating in a capitalist economy which has a positive area of operations—positive in the sense that it not only can enable the worker to attain the intermediate goals but the final end as well. It still all too frequently labors vainly in the *negative* area of operations, condemning the union as an unnecessary evil while mistakenly belaboring government for its interfering activities made necessary by management's own do-nothing attitude. Thus, management must avail itself of its positive area of operation or else lose forever the opportunity. How can this be done? Many progressive companies are already pointing the way. The result in some instances has been amazing. They have found that as a natural result of their positive endeavors, some of those functions given up as lost to aggressive unions are being returned. The heads of two powerful labor affiliations have gone on record as declaring that the unions have no desire to usurp functions that are being discharged satisfactorily by management. The abandonment of a policy of "labor baiting," with the adoption of a program of labor relations which anticipates union demands and makes plans for satisfying these demands with the least cost to business efficiency, is an experiment in the positive area which seems to have benefited industry, labor, and society. A positive program of assisting the worker to attain personal security by placing more emphasis on him as an individual, and economic security through an enlightened application of incentives, profit sharing, pensions, and insurance programs are more than worth the effort.

—From "Management's Responsibility," by OTIS LIPSTREU, in *Personnel Journal*, December, 1950.

Caloric Requirements of the Obese

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THE impression is gained from various sources that for each individual there is a caloric requirement which is fairly definite and fixed; and that, given the age, height, weight, sex, and occupation, this requirement can be determined with considerable exactness. Actually, what is estimated by the use of these data is the caloric expenditure; and, in theory at least, this is used in making recommendations to the obese. If, for example, it is desired that a person lose seven pounds a month, or about one-fourth pound per day, it should be possible for him to do this on a diet of about 1000 calories less than his estimated "requirement." The 1000 calories difference between intake and expenditure, it would be expected, would be made up by the mobilization of 120 grams of adipose tissue (containing 10% water) per day, so that energy needs would not suffer; and, as the weight decreased, the requirement could be re-estimated on a descending scale until it became the "ideal requirement" for a person of normal weight. At this point, the patient's weight being normal, he could add to his intake the 1000 calories difference between his dietary allowance and his ideal requirement and be assured that his problem of obesity was solved.

Such is the type of program to which current concepts of obesity would logically lead, provided efforts were made to individualize each case. For example, in a person whose current or balance requirement was 3500 calories, and whose ideal requirement at normal weight would be 3000 calories, it should be possible for him to regulate his weight on a diet of 2500 calories, dropping gradually to 2000 calories as he lost his excess weight. When the desired point was reached, he should then be able to proceed on an intake of 3000 calories without fear of regaining the weight he had lost. To what extent this works out in actual practice, each physician who deals with the problem of obesity must be the judge.

The first difficulty that arises, in thus individualizing the prescription for an obese patient, is in determining the current or balance requirement. This is done by the factorial method, which depends chiefly on laboratory techniques. Separate determinations are made of the requirement for basal metabolic activities, the S.D.A. factor, and the requirement for physical work; and these are then added together.

The number of calories required for basal metabolic activities is calculated from the amount of oxygen consumed over a measured interval of time, with the patient in the resting, post-absorptive state. Even when such technical details as putting fresh soda lime into the basal metabolism machine have been strictly adhered to, however, there remain variable factors which demand that the result of this test be viewed with some reservation. Rates determined on the same person will vary more than 20 points, according to the character of the last meal on the previous day.[1] The total quantity of food taken during the entire previous day will also affect the reading. In people who are already on calorically restricted diets, the reading will be lower than otherwise[2]; and any anxiety or apprehension will elevate the reading substantially. The result obtained, however, is multiplied to give the extent of the basal requirement over an entire 24-hour period. It is well known that the conditions under which the basal rate is obtained are not actually "basal," but are a necessary compromise. The metabolic rate while sleeping is ordinarily considered to be somewhat below that obtained by the standard test; but it may be higher or lower than this, depending upon whether sleep was preceded by work or rest.[1] It is difficult, therefore, to say to what extent the test gives more than an account of a person's caloric expenditure during the few minutes he is actually taking it; and, looming in magnitude over all these considerations is a systematic error in the calculated results as applied to the obese.[3]

After the basal caloric requirement has been thus estimated, the next step is to add to this the factor for the specific dynamic action of foods. Difficulty arises here when it is realized that it is the relative proportion of the various foodstuffs to each other, and not a simple sum of the S.D.A. factors for each, which determines this requirement for any combination of foods.[4] Actually, the specific dynamic effect of foods is a continuous process from one day to the next, and is not excluded actually, as it is theoretically, when the basal metabolism test is taken.[1]

Further difficulty arises in connection with estimation of the caloric requirement for physical work. This ranges from 33⅓ to 80% of a person's total caloric expenditure.[5] Ergometer studies have been applied to various occupations, but one of the difficulties arises from variations in the skill and efficiency with which different people perform their work. After-work activities are even harder to estimate than occupational ones. Two people may work the same number of hours a day, but in two hours of physical recreation one of them may expend from 300 to 1000 additional calories.[1] The "sedentary worker" who plays baseball in the evening may expend many more calories in 24 hours than the "manual worker" who does little more, in our mechanized age, than watch a ma-

chine. Hours of rest in bed also vary greatly. The man who needs only six hours of sleep is up and expending additional calories a significantly longer time than the person who sleeps eight hours or more. The prevailing temperature of the environment is another variable which has a substantial effect on caloric expenditure.[5]

These considerations indicate that an individual's caloric expenditure cannot be estimated with any but the roughest approximation to accuracy; and, in practice, this is probably rarely attempted. If the estimate is made, it is usually based on the assumption that the metabolic rate is "normal." The S.D.A. factor is assessed at about 10% of the basal needs; and some such rough estimate as 50% of the basal requirement is allowed for a person of moderate activity.[6] One is naturally led to wonder why such "estimates" are made at all. In fact, in the treatment of the obese, they are often dispensed with completely. Instead, it seems, the patient is given a diet as low in caloric value as he is likely to tolerate. Since, as is well known, anyone will lose weight under complete starvation, some compromise is made between that state and a "caloric requirement" which is largely mythical. The compromise depends on whatever caloric bargain can be struck between the physician and his more or less reluctant patient. This method of handling the problem of obesity is one of the greatest indictments of the factorial method of estimating the caloric requirement. Reference to such a "requirement," it seems, can serve little purpose but to enhance a prescribed low calorie diet with an aura of scientific exactness for which there is no basis whatever.

The factorial method has been useful in estimating the food needs of large population groups. The great variations found among individuals on whom sample tests are run[1] are balanced out in the rough averages which serve adequately for the purposes to which such studies are directed. Orr and Leitch,[1] and also Keys,[5] have warned about the application of figures so obtained, to individuals. This warning, it seems, has not been heeded. Although caloric requirement tables giving such information as 3000 calories for a bookbinder and 3100 for a shoemaker[7] are less in vogue than formerly, there seems to be a considerable weight of authority popularly attached to such a figure as 3000 calories for an average man of moderate activity"; and it is strange, indeed, that such a figure should ever be applied to any individual.

The difficulties in estimating caloric requirements have been recognized by Mitchell, who says, "Because of the variability of requirements, attempts to establish caloric allowances are not very satisfactory," and he concludes a discussion of the subject with the following statement: "Nevertheless, the practical, everyday method for judging the adequacy of the caloric intake is to watch the body weight, increasing or decreasing the total amount of a suitable mixed diet of an adult so as to maintain weight at a chosen level."[9] This method is, no doubt, more generally used than is the factorial method. Mathematical estimations of the caloric requirement are, advisedly, dispensed with. The requirement is considered here under the term, "adequacy of the caloric intake," which is estimated from observations of the body weight. We must now analyze this method to see if it is suitable for determining the caloric requirement of the obese.

THAT all obesity results from a disproportion between caloric intake and output, there can be no doubt. How is it possible that a person's adipose deposits could increase otherwise than by the ingestion of food which, instead of being oxidized, is stored as fat? This principle, which is a simple application of the law of conservation of energy, forms a solid framework within which all discussions of obesity must find their place. Although in order to gain weight an individual's caloric intake must exceed his expenditure, it does not follow that it must exceed, or even equal, his caloric requirement. On the contrary, it is quite possible that a person may have an intake lower than his requirement and an expenditure lower still. Under these conditions, weight gain must necessarily ensue. It would be expected, in such a case, that we would find an inefficient metabolism, whereby an abnormally large proportion of ingested food was diverted to storage as fat, while energy production in the tissues declined below optimal.

There is reason to believe that these circumstances exist in many of the obese.[3,10] It is not surprising, therefore, to find in a study by Ohlson, that a group of girls in Michigan were maintaining a state of obesity on an intake of only 1690 calories[11] nor, in a study by the Millbank Fund, that 47% of a group of high school pupils were overweight in spite of a caloric intake which would put them in the undernourished class.[12]

These observations give rise to questions of what, actually, constitutes the caloric requirement, and whether the body weight can serve as a criterion for the adequacy of its fulfillment. That the requirement may be greater than the expenditure is a concept which, no doubt, has seldom been entertained. Indeed, such a concept could find no place in considerations of obesity until it became clear that the combustion rate of the obese is lower than that of people of normal weight.[3] This finding indicates the need for a more dynamic concept of caloric nutrition to replace the static one which has relied on observations of gross bulk. The caloric requirement must serve, not only to maintain an individual's weight, but to maintain a normal oxidation rate as well. Though the body bulk may be large, a diminished heat production indicates that the tissues are undernourished.

Benedict[13] deplored the tendency, fostered by reliance on the surface area law, to emphasize the quantity of heat given off by an individual rather than the quantity of heat produced. The first is an index of the second, but, as Benedict observed, it is the heat production which is the important thing, and it should come first in considerations of human metabolism. When emphasis is placed on the rate of cooling, efforts are made to adjust the caloric intake to this, with the assumption that, when this is done, all possible considerations of a caloric nature have been completed. The result has been, thus far, that caloric studies of the obese have done little more than demonstrate the law of conservation of energy. Caloric concepts have followed simple principles of balance akin to Newtonian mechanics, while in other fields of medical science, great elaborations of knowledge have been built within the framework of the more fundamental structures. Thus, in spite of considerable knowledge of the differences in intermediary metabolism of fat and carbohydrate, these two major sources of energy are considered in practical dietetics as largely interchangeable in all people, with no need to think of them except in regard to the caloric value represented by a gram of each.

The role of enzyme inhibitors naturally occurring in foods is scarcely considered in the current practice of nutrition; and, while it is recognized in a vague way that "the body will draw on" adipose deposits when the organism is starved or semi-starved, little or no thought is given to the degree of starvation necessary to bring this about in different subjects. The roles of catalytic agents, hormones, enzymes, and the thermodynamics involved in intermolecular reactions are ignored in simple concepts reminiscent of an eighteenth century discussion of the kinetic properties of billiard balls. It is no wonder that Keys has said, "Much more research, especially quantitative studies on man, is needed to create a true science of nutrition."[12]

A dynamic concept of caloric nutrition must consider not merely the gross amount of foodstuffs supplied but also the factors which affect their availability to, and utilization by, the tissues for energy. It must consider those physiologic circumstances which cause ingested food to be diverted to fat storage in greater proportion than normal, as well as those which inhibit the mobilization of fat from the adipose deposits.[10] It must consider the great differences in the intermediary metabolism of fat and carbohydrate and the effects of the ingestion of these two major sources of energy on the hormonal balance which directs their fate in the body. In particular, it must consider the presence, in some individuals, of defects in enzymatic oxidation, and the role of enzyme inhibitors in maintaining these defects. All of these things operate within the framework of the simple "caloric balance," which has been amply demonstrated since the time of Lavoisier; and they affect profoundly the availability to the tissues of nutriments on which energy production depends. Only with full recognition of these matters can caloric requirements, henceforth, be intelligently considered.

Consideration of these matters illuminates the inadequacy of low calorie diets in the treatment of obesity, an inadequacy already discerned intuitively by great numbers of physicians in spite of "scientific" pronouncements based on the more elementary interpretations of simple caloric balance studies. What happens when low calorie diets are applied is that the starved tissues of the obese are starved further. Energy production, already below normal, declines to a lower figure still. The first noticeable effect of such a calorie shortage is limitation of the voluntary activities of leisure hours.[1] Efficiency at work is also impaired.[14] The various avenues of caloric expenditure are all contracted in adjustment to the diminished food intake; and the importance of this in the case of those in positions of responsibility is readily understood when it is realized that even the simple matter of alertness makes significant demands on caloric expenditure.[1] By reduction in voluntary activity and decline in basal metabolism, the organism tends to adjust caloric expenditure to a reduced caloric intake[5] and thus defeats the purpose for which low calorie diets are prescribed. As a result, the caloric value of reducing diets is often set at a lower and lower figure until there is achieved the therapeutic absurdity of bringing a person so close to the level of complete starvation that he must remain in bed. This has been the logical result of uncritical reliance on concepts of "caloric requirement" which, whatever may be the advantages of their simplicity, are thoroughly inadequate.

WHEN such concepts of caloric nutrition are abandoned in favor of more dynamic concepts, however, attention becomes focused on measures which will bring about, in the obese, an optimal level of energy production in the tissues. While, in this connection, further exploration of the matter of naturally-occurring enzyme inhibitors is indicated, the major problem appears to be solved in most cases by the substitution of fat for carbohydrate as the chief source of energy, along with a high protein diet.[10,15] When this is done, the stimulus to deposition of fat is lessened, with the result that energy supply to the tissues proceeds, quantitatively, from the food ingested. Mobilization of fat from the adipose deposits, which is a continuous process,[16] proceeds unhampered. The result is a decrease in the amount of fat deposited in the body. This, of course, is the desired objective in a weight reduction program; but of equal importance is that, even while weight is being reduced, the tissues are receiving a full caloric supply of nutrient ma-

terials. There is, therefore, no tendency on the part of the individual to limit his energy expenditure as he would in adjustment to a reduced caloric intake. On the contrary, an increased energy production, sufficient to fulfil the demands of work and leisure activities, is the result.

When the problem of obesity is handled in this manner, the only necessary guide to the caloric requirement of the obese is that of the individual's own appetite. The appetite, in fact, is, in general, the most reliable guide to caloric requirement, though it can operate as such only under circumstances in which the tissues can utilize for energy the food ingested. It is a remarkable thing, in view of the difficulties encountered in attempts to calculate the caloric requirement, to consider the extent to which great numbers of people maintain normal weight and good health, year after year, without taking thought of the number of calories or the amounts of food ingested. When hungry, they eat. When satisfied, they stop eating. If physical exercise, by increasing caloric expenditure, increases their requirements, they eat more, not by calculating the energy output which must be balanced, but by the simple matter of satisfying an increased appetite. If the temperature of the surrounding atmosphere is elevated, thus decreasing caloric expenditure, the appetite decreases accordingly and with great precision. The mechanism of appetite is one of the oldest enigmas known to physiologists and is by no means completely understood. Neither hunger contractions nor the glucose level of the blood explain it completely.[2] Bauer probably stated the matter as best possible in the following words: "It is the requirement of the organism . . . . which rules the appetite."[17] Theodore Ruch[2] described it as a "physiological drive."[6] The information we have indicates that hunger comes, essentially, from the tissues, and that when a person is hungry it is an indication that his tissues need food. This appears to be a natural function with which man is endowed for adaptation and survival in a "normal" food environment. On this subject Keys[5] remarked, "In a simpler world, without the disturbing factors of processed and otherwise disguised foods, of the social pressures associated with eating and the frequent substitution of food concepts in personal psychodynamics, man might more uniformly strike an ideal balance between caloric intake and requirements, always assuming that an abundance of food is at hand." In this statement there lies, undoubtedly, much of the reason why many people are unable to depend on the natural mechanism of appetite and must either have recourse to dubious estimations of their caloric requirements or else, as would seem preferable, switch from carbohydrate to fat as a major source of energy.

The type of fat used appears to be of importance when such a diet is applied to individuals who have atherosclerosis or who are considered to be predisposed to that condition. Though cholesterol is not formed from fat,[18] nor does either fat or cholesterol raise the cholesterol level in the blood,[19,20] certain food fats appear to contain non-cholesterol substances which raise the blood level of cholesterol.[21,22,23,24] The most probable explanation of the mechanism by which these things operate is by enzyme inhibition, in predisposed individuals, of certain essential steps in the normal metabolism of cholesterol. Other types of fat, however, do not seem to contain such substances; and the ingestion of great amounts of these fats is compatible with a cholesterol level which, by current standards, is remarkably low.[25] The whole matter of cholesterol metabolism in its relation to atherosclerosis, as is well known, is receiving much study in various parts of the country at the present time.

One thing which seems well established is that there is a direct relationship between the degree of atherosclerosis and the amount of fat deposited in the adipose tissues of the body.[26] Wilens' analysis of the type of fat found in atherosclerotic arteries showed it to be similar in composition to fat deposited elsewhere in the body. Weight reduction in the obese atherosclerotic person, therefore, appears to be urgently indicated; and, in view of Deuel's finding that the ingestion of fat has no special tendency to increase the fat deposits of the tissues,[27] there appears to be no contra-indication to the use of properly selected fats in the diet of atherosclerotic individuals. Rather, the advantages to be gained through reduction of weight and increase in the oxidation rate of the tissues make their use highly desirable.

Summary

1. CALORIE requirements cannot be estimated for individuals with sufficient accuracy to furnish a scientific basis for the low calorie diets used in obesity. Such diets operate merely on the principle of starvation.

2. The weight, or gross bulk of the body, is not a reliable criterion for adequacy of caloric intake.

3. A dynamic concept of caloric nutrition must aim at a normal oxidation rate in the tissues as well as normal weight. This can be accomplished in most cases of obesity by the use of fat instead of carbohydrate as a major source of energy.

4. When this is done, the appetite can be depended on to adjust the caloric intake to calorie requirements.

5. A proper selection of dietary fats is required for obese atherosclerotic persons, in whose cases the reduction of weight is urgently indicated.

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Industrial Medicine—The Medical Profession's Step-Child?

FOR several years this writer has been privileged to serve as chairman of the Missouri State Committee on Industrial Health. During this time, we have met many industrial physicians from these parts and throughout the United States. Added impetus has been given to the development of industrial medicine by the rapid strides in the specialty and by the ever-increasing industrialization of our entire country. When we hear reports that St. Louis ranks No. 7 among hypothetical targets for enemy A-bombs (in case of an all-out war), it gives Missourians an idea of Missouri's industrial importance. Most of us who are indigehous, perhaps subconsciously, have always considered Missouri as a state of vast and diversified agricultural pursuits, with exploitation of our natural resources as an important adjunct. However, the statistical truth is that Missouri is one of the more important industrial states. Discouragingly enough, the medical facilities for providing adequate industrial health programs have not kept pace with our state's present status in industry. Among the members of the medical profession, there is a lack of interest in this field and there is a general apathy among practitioners concerning the need for a better brand of industrial medicine. This fact is best illustrated when post-graduate and other educational projects concerning industrial medicine fall flat on their face—for want of an audience—whenever presented in Missouri. Several programs have been arranged which should have had better attendance and though the quality of the presentations admittedly was high, due to the lack of interest the performances were practically failures. Missouri physicians are not unusual in this respect, if we may judge by reports from other parts of the country in which they record small attendance and very little interest. Most recently, we read the lamentations of another state chairman of industrial health whose experiences coincided exactly with these observations. Why should industrial medicine be the medical step-child? Is it because there is not enough money to be made? Or, is it because industrial medicine does not present the research challenges of general practice or of the other specialties? Perhaps it is because the opportunities and advantages of industrial medicine are not widely enough known and understood to be stimulating. While it is true industrial physicians ordinarily do not make fabulous fortunes in this field, it is equally certain this specialty does present financial rewards which are not niggardly, actually they are satisfactory. And, while the problems usually are not those of life-saving glamour (such as the medical student's dream of finding the cause and cure of cancer), there are many enigmas in industrial medicine, the solution of which would do much for the lives and the health of thousands of our citizens. Perhaps it is then that the field of industrial medicine is poorly understood, as an explanation for the dearth of interest shown by our profession. As our country becomes industrialized to a greater extent, it seems shortsighted for our medical leaders, the molders of medical thought, not to exert more pressure in developing this medical specialty. As matters stand today, there is a woeful lag in this direction. From all appearances, industrial medicine is the neglected step-child of our profession.

—VINCENT T. WILLIAMS, M.D., "Editorially Speaking," in *Jackson County Medical Society Weekly Bulletin*, April 14, 1951.

Non-Sensitization of Nylon Thread

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NYLON, since it first came into use as a fabric in 1940, has frequently been suspected as a cause of contact dermatitis. Schwarz et al[1] in a study of an outbreak of dermatitis in that year from various fabrics including the new "synthetic silk" or nylon, found that the cause was not the nylon itself but a finish applied to the stocking, an emulsion of an acid ester gum. Nylon stockings with a different finish did not cause dermatitis when worn by the affected persons.

In the same year, Hazel[2] reported a case of suspected nylon sensitivity, and suggested that the sensitivity was due to a resin applied to the stocking as a finish. Fanburg,[3] also in 1940, in an analysis of four patients who developed a dermatitis from dyed nylon stockings, performed patch tests that revealed positive reactions to the stockings, but negative reactions to undyed nylon on the same patients.

Schwartz and Peck[4] proved in another group of suspected nylon-sensitive patients, that the eruption was caused by the finish and not by the undyed nylon. Dobkevitch and Baer[5] in 1947 studied 13 subjects with nylon stocking dermatitis. Patch testing revealed that the condition was due to a dye and not to the undyed fiber.

In all cases there was a hypersensitivity to paraphenylendiamine. Barton[6] reported the case of a patient who was sensitive to a nylon hair net but not to nylon stockings. Inasmuch as the hair nets are usually dyed, he concluded that the dermatitis was due to the dye in the hair net.

The present study was concerned with the possibility of sensitization to undyed nylon thread, and was carried out in a plant* whose major output is nylon thread, prepared for various industrial purposes such as sewing spools, surgical sutures, parachute cords, fishing lines, and so forth.

The firm at the time of the study employed approximately 150 persons, 70% of whom were women. Approximately 100 have been employed at the plant for nine years and have been in intimate contact with nylon during these years; the remaining 50 employees have been at the plant and in contact with nylon for periods varying from three months to nine years. During these nine years, there has been no report of a dermatitis resulting from the handling of nylon thread in any form. Thirty subjects were chosen for this study. Twenty-five were employees of the plant and five were patients from the author's private practice who had contact eczema due to various etiological agents. Five of the employees, or 20%, gave a past history of some allergic disease. Two of the five had had skin allergies, one to deodorants, and one to hair wave lotion. Two subjects had asthma and one had hay-fever. Five employees, or 20%, had a known positive allergic family history.

The procedure used in the patch testing was as follows: Two tests were performed on each subject—one to nylon thread moistened in water, the other to a nylon flake, which is used as a binder for the thread. The flake was first dissolved in ethyl alcohol, the solvent ordinarily used. A small piece of thread was placed on the right forearm and a drop of the nylon flake solution on the left forearm. Each was covered by an adhesive patch over a circular piece of cellophane. The patches were applied on the anterior surfaces in 25 cases and on the posterior surfaces in five cases. The patches were left on for 48 hours and examined.

The subjects were questioned regarding pruritus at the end of 24 and 72 hours, and also at the end of seven days.

RESULTS: There was no indication of a dermatitis on any of the tested sites when examination was made. No subject complained of itching on either the site of the nylon thread or the nylon flake.

Summary and Conclusions

A GROUP of 25 female employees of Heminway & Bartlett ranging in age from 19 to 79 years were selected at random for study. Twenty percent had positive allergic past history and 20% had a positive allergic family history.

2. Five additional subjects were selected who had known contact eczemas of various etiologic origins.

3. All 30 individuals were patch tested to nylon thread moistened in water and to nylon flake dissolved in alcohol.

4. After continuous contact for 48 hours, no positive reactions to the nylon were obtained.

5. Sufficient evidence was obtained to prove that undyed nylon thread is non-sensitizing.

(135 West Main St.)

*Heminway & Bartlett, Watertown, Connecticut.

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Alcoholism in Industry

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BECAUSE of the protean nature of the problem of alcoholism, it is hoped that this discussion will come to the attention of those who may have had this difficulty as a complication of another nervous or physical illness, as well as to the attention of those with whom alcoholism is a dominant problem. Furthermore, it is hoped that the information presented here will aid in orienting the thinking of alcoholic patients, their relatives, their employers, and those who contribute to their treatment.

Historically, the abuse of alcohol probably began at the time it was discovered that certain carbohydrates ferment to produce it. Since that time it has become an immense social problem for which no solution has been found. This was demonstrated by the unsuccessful experiment known as the Eighteenth Constitutional Amendment. Among the facts established by this experiment were these: (1) alcoholism is a refuge and retreat indulged in by so many people that it could not be abolished by law; (2) the drive which stimulated individuals to procure alcoholic beverages at the expense of sacrificing their good citizenship was sufficient to overcome in many what were necessarily tremendous qualms of conscience; (3) prohibition as a national experiment was foredoomed to utter failure, and the tremendous cost could have been prevented had a detailed study been made prior to the experiment.

Frequently scientific research explodes fallacious but commonly held beliefs. When this occurs, the public gradually drops the fallacious belief and accepts scientifically proved facts. One of these unfounded beliefs is that alcohol is a stimulant. It is a well-established fact that alcohol is a narcotic and not a stimulant, from the beginning of its direct action on the central nervous system. This is easily demonstrated both in human beings and in lower animals. The appearance of stimulation is deceptive and arises from the release of lower nervous centers from the control of the higher by depression of the latter. This allows the emergence of attitudes, feelings, emotions, urges, and drives by the removal of action of the higher mental centers which normally keep these under inhibition. One of the earliest mental symptoms resulting from the abuse of alcohol in many patients is an increased tendency to act impulsively in accordance with primitive instinctive forces and the momentary affectivity.

This leads us to the important problem we always encounter in the study of alcoholism: Why do people drink to excess? There is no single answer. The occasional abuse of alcohol, the periodic overindulgence, if not too frequent, probably does the person less harm than the harm it does to society, for it is society that must suffer from the results of the person's excesses. But what produces the chronic, habitual user of alcohol? Why does he drink? Most patients, when asked, will say they do not know, or will answer that it is because they like the stimulation it gives them; but we have already pointed out that alcohol is at no time a stimulant, except for the local effect as an irritant on mucous membranes.

Reasons given for overindulgence are legion. The person is "perverse," "no good," a "n'er-do-well"; he is unhappy, he drinks to drown his sorrows, he has an unhappy home, and so on. It is probable that in a few cases these reasons are adequate, but where they are, the patients are not chronic drinkers. The person who periodically or habitually overindulges in alcohol imbibition does so usually for reasons he does not know. The alcoholic is usually sensitive to the tension of his psychic conflicts, has difficulty in dealing with them, and seeks to escape from his problems rather than to face them. Often as these problems press upon him he becomes restless, irritable, apprehensive, and gloomy. As alcohol removes his inhibitions, the repressed energy of his drives, which are usually not socially acceptable, flows freely and he becomes gay and irresponsible, and tends to exaggerate, to boast, and to give free vent to his imagination—all of which tends to hide his feelings of inferiority, and to give him a sense of adequacy and security. But in providing adequacy and security, those qualities necessary for social adaptation are weakened, and the alcoholic comes into conflict with the law.

WE MAY say, then, that probably most alcoholic patients drink because they have deep-seated conflicts, unsatisfied drives, worries, and unaccomplished ambitions which they may, but usually do not, appreciate consciously. That this is not always true is obvious. Probably the social drinking of youth arises from different motives; perhaps the drive to cut off authority, so that the emotional life may be lived more intensely.

It is apparent that the alcoholic patient does not have a well-integrated personality in that he is not receiving stimuli from the environment

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adequate to bring about the integration he needs. In other cases, his personality is so disrupted that he is unable to utilize the environmental stimuli designed to stabilize him.

Alcoholism must be considered an habituation, and not an addiction, although at times it may become a quasi-addiction. Numerous investigators have attempted to show that there develops in some patients a "physiological demand of the tissues for alcohol." This has not been established scientifically, and there is no supportive evidence for this belief. Others have assumed that the initial alcohol taken into the body acts as a sensitizing agent, thus setting up an allergy which provides the need and the incentive for further drinking. This is essentially a rationalization on the part of the alcoholic patient. No allergy toward alcohol has ever been demonstrated, and any attempt to explain alcoholism on the basis of an allergy constitutes an effort to eliminate the psychological factors basic to the habitual use of alcohol. The following case, previously cited,[1] illustrates this point.

A young man with a substantial fortune had used alcohol for many years. After one of his more serious episodes he had been placed under the care of a companion, who in reality was a male nurse, although this was unknown to the patient. The companion was delegated to act as a friend and general supervisor of the patient's activities. Included in these activities was an almost daily game of golf, of which the patient was exceedingly fond. A period of several weeks passed during which the patient was, at least upon the surface, content. One day when he and his companion were approaching the ninth green, as the patient reached for his mashie, he suddenly straightened, threw the golf club down, and exclaimed, "I've got to have a drink," and started off in the direction of the clubhouse. The male nurse attempted to restrain him physically, but the patient threw his friend to the ground, and ran the distance of the course to the clubhouse. Thirty minutes later he was lying on the locker-room floor, dead drunk.

This case demonstrated that no allergy was operative in producing this sudden demand for alcohol. It arose as an impulsive psychological abnormality.

At times a quasi or psychological addiction may occur to alcohol; however, this is not a true addiction, as when the alcohol is withdrawn, the symptoms can be relieved by the substitution of a drug other than alcohol. In this case a drug such as paraldehyde may be substituted In true addiction, no substitute drug is effective in taking the place of the drug that is removed.

AT THIS point we should consider the mental disorders that result from the prolonged overuse of alcohol. These can be divided into the acute and the chronic. Of the acute, the most common is delirium tremens. Then in order of frequency, we encounter pathological intoxication, acute alcoholic hallucinosis, and alcoholic epilepsy. Of the chronic mental disorders due to alcohol the most common one by far is chronic mental deterioration, then Korsakoff's psychosis, and, finally, Wernicke's polioencephalitis hemorrhagica superioris, and a rare condition due to the drinking of Italian red wine, Marchiafava-Bignami disease.

It is of particular interest that delirium tremens and acute alcoholic hallucinosis do not occur from any cause unassociated with the abuse of alcohol. Alcohol is the only drug or condition that will produce these two disorders. By contrast, Korsakoff's psychosis and Wernicke's polioencephalitis hemorrhagica superioris do occur at times without the presence of alcohol, and are, therefore, directly due to dietary and vitamin deficiencies.

Occasionally there is observed an unusual case which Nielsen and Thompson[2] have termed alcoholic schizophrenia. These cases are of persons who are schizophrenic when they drink, but who are not schizophrenic when sober. Apparently, alcohol brings out the basic schizophrenic symptomatology in their personalities, and as soon as they stop drinking the symptomatology is removed. These cases must be differentiated carefully from acute alcoholic hallucinosis and can be primarily by the fact that in the latter disorder the basic symptomatology of schizophrenia is not present, whereas in alcoholic schizophrenia this symptomatology does appear.

Alcoholic epilepsy is important and of interest. We know, of course, that all individuals are epileptic if given sufficient stimulation. It is undoubtedly true that alcohol acts as a trigger mechanism in people who are subclinically epileptic, and that alcohol causes them to have convulsions, whereas without it they would not. In some cases there may be a gradual deterioration effect upon the brains of these patients due to alcohol, with the dropping out of nerve cells and their replacement by scar tissue. This may represent the development of epileptic foci, and in these cases the alcohol, by its toxic effects, may become a direct causative mechanism of epilepsy. Closely related to alcoholic epilepsy and pathological intoxication is the disorder known as psychomotor epilepsy. Attacks of psychomotor epilepsy and pathological intoxication are essentially indistinguishable except that psychomotor epilepsy appears without the provoking effect of alcohol. Insofar as the symptomatology is concerned, the two are indistinguishable, and it is believed that pathological intoxication and psychomotor epilepsy are essentially identical, except that in the former the presence of alcohol is necessary in order to set off the psychomotor attack.

We are more interested in the disorders of personality as causes of alcoholism than we are

in the mental disorders resulting from it. Many attempts have been made to demonstrate that there is an "alcoholic personality," that is, a personality type that leads to alcoholism. These attempts have never demonstrated successfully that there is an individual with a specific personality type who indulges excessively in alcohol. There is a personality type which goes to excess in all things, whether it be alcohol, eating, working, playing, or other activity. There is no specific personality type leading to alcoholism. In Rorschach studies of alcoholic patients, Buhler[3] has found primarily, Rorschach signs of "accumulation of tension" and "anxiety." Buhler concludes:

"The alcoholic is a person who, because he cannot stand the strain and tension of life without developing strong anxieties, escapes from responsibilities into oblivion. As adolescense is the age in which the individual is expected to take his share in the responsibilities of human life, this is the age in which the alcoholic begins to fail and to escape into the oblivion he needs."

The studies of nearly all workers indicate that the alcoholic needs "a periodic escape" from his own personality characteristics. Instead of this it seems to the writer that what the alcoholic patient is doing, is attempting to ventilate his personality characteristics rather than to escape from them. These characteristics demand periodic expression, and alcohol makes this expression possible. Periodically, the alcoholic patient needs to "be himself," and he does this through his drinking.

The various groups of patients with psychiatric disorders who drink to excess are the "normal drinkers," persons with mild or moderate degrees of cyclothymic personality reactions, some with schizophrenic characteristics, those with basically psychoneurotic personalities, and, finally, those with varying degrees of psychopathic personalities.

Among the so-called "normal drinkers" we may include those who have some of the personality characteristics described above. Also among this group are those to whom the term "promotion depression" was applied by Dr. Adolf Meyer. These are people who are unable to meet the responsibilities of positions to which they are advanced, and who therefore go into mental depressions and drink because of their depressions.

OF PARTICULAR importance to industrial medicine is the incidence of alcoholism among different occupational groups. We need not cite the incidence in industrial workers generally, or among other personnel. Interestingly, no one occupational group seems to have more alcoholic patients than others. Among almost every group we find those who drink to excess. At this point, another factor should be mentioned which is of great importance as far as industry is concerned. This is a phase of the problem which seems to escape many of our social and industrial reformers. Readily, we admit the imperfections of the human mind. Most of our supervisory personnel, with but elementary knowledge of psychological principles, are quick to state that the human organism can tolerate just so much stress. But in spite of this knowledge, and in spite of the realization that our mental hospitals are filled with those who have fallen under the stress of their environments, under working situations intolerable to them, or simply under the burden of living through periods of necessary readjustment, *we continue to place workers in jobs for which they are unsuited, to enforce factors of stress to which we would not subject a mechanical contrivance, and to expect performance beyond the capacity of the emotionally handicapped person.* Is it, then, surprising that a week-end retreat into alcoholism is almost the rule with great numbers of industrial workers, or that many of these continue the week-end retreat into the next week, and become industrial casualties? Many of these emotionally handicapped individuals are essentially normal men who drink to enjoy relief from the necessity of living up to standards unnaturally high for them. Others, for example, coal miners, drink heavily to compensate for long, grueling, monotonous, and physically wearing jobs. Great numbers of laborers and artisans become intoxicated each Saturday night. Knowing the work that many of these men have to perform, and the industrial handicaps under which they work, is it surprising that they use alcohol as their mode of escape?

AMONG those with abnormal mental reactions who drink to excess, those with cyclothymic personalities should be considered carefully. Most important among these are persons with the disorder known as hypomania, and those with chronic depression. In both groups alcoholism is extremely prevalent, and these two mental disorders are much more common in the population than has previously been noted. Also, in the manic type of cyclothymic psychosis, severe alcoholism may occur.

Schizophrenic patients for the most part do not become excessive users of alcohol. There are a few, however, who do drink to excess, and the subject of alcoholic schizophrenia already has been discussed.

It is probable that most excessive users of alcohol have basically psychoneurotic personalities. Many of these patients suffer from anxiety neurosis, and through the use of alcohol they obtain relief from the anxiety characteristics of their mental disorder. In some cases, their sex hunger is displaced to the gastric sphere, and the patient may overeat. Occasionally, to avoid the effect of overeating and becoming overweight, the patient substitutes alcohol and becomes chronically alcoholic.

Numerous persons with psychopathic personalities drink to excess. Among these should be mentioned those with partial psychopathic personalities. In these patients, alcohol acts as a completing agent for the psychopathic personality, in that it enables a partial psychopath to become a complete one, and thereby to obtain the satisfaction of his psychopathic drives. While under the influence of alcohol, he can carry out psychopathic behavior; whereas, when not intoxicated, he has some inhibitions which prevent him from doing so. The relationship between pathological intoxication and psychomotor epilepsy has been mentioned previously. Pathological intoxication, psychomotor epilepsy, and psychopathic personality are probably synonymous terms as far as their relationship to alcohol is concerned.

THE treatment of alcoholism, is, of course, the treatment of its cause. Specific therapy for the direct effects of alcohol upon the patient need not be mentioned here. The numerous recent advances in the use of adrenal cortical extract, the new liver protective agents, such as choline and methionine, are examples of the great advances that have taken place in recent years.

Concerning treatment for the personality disorder basic to alcoholism, the obvious treatment, of course, is psychotherapy. Because it is not possible to apply psychotherapy to an intoxicated person, various aversion treatments have been developed to get the patient into condition so that he can be reached by psychotherapeutic procedures.

As this author has stated previously, "regardless of the type of psychotherapy applied, whether it be ego-supportive psychotherapy or psychoanalytic psychotherapy, there is one fact that emerges to confront every therapist. This fact is that until the alcoholic finds that life without alcohol is more satisfactory than life with alcohol, he will continue to drink."[1] To return to our original basic considerations, our patient must become constitutionally able to use adequately the stimuli of the environment, and the environment must present stimuli adequate to enable the patient to stabilize himself.

The use of antabuse should be mentioned. Antabuse will probably become an important therapy in the treatment of alcoholism, but it has its limitations. Antabuse is effective with the cooperative patient, but he must be willing to take his drug. It should be mentioned that it is not an aversion treatment, and that there are certain hazards in the use of the drug such as liver damage, cardiac damage, diabetes, tuberculosis or other pulmonary pathology, toxic goiter, and barbiturate intoxication. In all of these conditions the use of antabuse should be carried out with great caution. Antabuse is becoming an important adjunctive therapy in the treatment of alcoholism. It has many advantages, but also many disadvantages, and like any other form of treatment should be used only in carefully selected cases.

We see that alcoholism is a disease that affects the emotionally handicapped person, and it is such a person who directly affects the smooth operation of the industrial machine. If one considers all the disorders suffered by the emotionally handicapped person, he is impressed immediately with one disturbing factor, namely alcoholism. Other than the common cold and perhaps dysmenorrhea, there is no illness or emotional disturbance that has more far-reaching effects, and plays more havoc with the smooth operation of the industrial machine than does alcoholism.

Recommendations

KNOWING these things to be facts, certain recommendations are made to industrial organizations in order to combat this increasing problem.

First, it is the duty of psychiatrists to assist industrial management to understand alcoholism as an illness.

Second, the emotionally handicapped person who has alcoholism as a problem should be referred for psychiatric evaluation and treatment; if alcoholism is a complication of his emotional illness, then the employment of aversion treatment by emetine, the use of antabuse, or these plus intensive psychotherapeutic treatments should be utilized. The help of Alcoholics Anonymous should be sought wherever practicable.

Third, where adequate public agencies for the treatment of alcoholism do not exist, state or other public funds should be appropriated for the use of private treatment agencies, so that patients can be treated who would otherwise go without help.

Fourth, it is recommended that insurance plans and sick benefits be extended to cover alcoholism and its treatment, in order that industrial employees may be treated for alcoholism without penalty of loss of time or wages because of their illnesses—i.e., their drinking.

Finally, it is urged that wherever possible, state or Federal tax funds derived from the sale of alcoholic beverages should be used for the treatment and rehabilitation of alcoholic patients, as well as for further research into the causes and treatment of the disorder.

It is believed that only through such an extensive program, carried out with the cooperation of industrial agencies, can this great hazard to the industrial machine be effectively met.

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The Rehabilitation of Alcoholics in Business and Industry

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THERE are far too many who cling tenaciously to the cliché that if a man or woman once has been a problem drinker, he or she always will be a problem drinker. Although the alcoholic or pathological drinker, in nearly all cases, never again will be able to drink with consistent moderation, it does not necessarily follow that once a man or woman has become an alcoholic, all hope is gone. Alcoholics can be salvaged and alcoholics *are* being salvaged.

"Rehabilitation is the restoration of the handicapped to the fullest physical, mental, social, vocational and economic usefulness of which they are capable."* To rehabilitate alcoholics in such a comprehensive manner is within our reach.

An alcoholic, as is well known, is one who cannot face life without alcohol. Alcohol has become a crutch to be used in leaving the world of reality with its persistent challenges and responsibilities, and entering the world of fantasy, free of frustrations and conflicts. To the alcoholic, life has become so unbearable that he compulsively seeks alcohol to relieve himself of his anxieties and feelings of inadequacy. He uses alcohol as a sick person in pain uses opiates.

Many leaders of business and industry are but dimly aware of the variety and complexities of the problems related to alcoholism that operate in the world of work. About 65 million people in this country use alcoholic beverages. Of these, about three million will imbibe to the extent where their security and welfare are threatened. It is this three million who present serious problems.

Alert industrial physicians, executives, and personnel managers *also* are aware of the more subtle drains upon industry due to the drinking of non-alcoholics, euphemistically called "social drinkers." Many of these social drinkers could be called "pre-alcoholics." There is no doubt that from the rank of the social drinkers come nearly all of the alcoholics. Social drinkers entering the "pre-alcoholic" phase, as well as clearly established alcoholics, work with reduced judgment, impaired skills, lowered work output, poorer neuromuscular coordination, and greater risks of accidents. Thus, it is obvious that business and industry suffer reduced production and fewer benefits.

Alcoholism, to a great extent, may be considered to be a non-occupational disability, although certain industries and occupations appear to be conducive to the development of alcoholism. Page[12] has written: "Non-occupational disability is without question one of the most important problems confronting management at the present time. The incidence of non-occupational disability in any industrial concern is a measure of the adequacy of management and employee relations, over-all efficiency and basic morale. Non-occupational disability affects the initiative of the individual worker, his willingness to serve; it affects labor relations and it affects profits."

What are some of the measurable costs of excessive drinking? Jellinek[5] conservatively has estimated that of the three million alcoholics in the United States, 2,060,000 are regularly employed, and during the year 1943, an average of 22 working days per alcoholic worker were lost because of excessive drinking, amounting to approximately 30,000,000 lost working days. The loss in wages in 1947 was $432,000,000. In addition, another $31,000,000 was spent for medical services, and $25,000,000 for the jail maintenance of alcoholics.[6] The above figures are conservative ones. In 1949, the city of Los Angeles estimated it had spent 4¼ million dollars in the jail maintenance of alcoholics.

Alcoholics have twice as many industrial injuries as do non-alcoholics, and this amounts to an average cost of about $80 per year.[1,4] In 1947, alcoholics were responsible for about 1,500 fatal accidents at work.[3] Compared to non-alcoholics, the life span of the chronic alcoholic is about 12 years less.[3] This means that many valuable executives, technicians, mechanics, and workers are lost to their organizations at a time when they could be most productive. This is a serious loss to business and industry, since hundreds of thousands of dollars have been invested in the training of these workers.

The apparent loss to industry because of alcoholism is approximately one billion dollars,[4] and another billion dollars is lost each year by the alcoholics themselves.[1] Since business and industry also pay taxes, it is of interest to know that each alcoholic costs society about $5,000

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*Definition adopted by the National Council on Rehabilitation, August, 1942.

per year.[1] The major function of many police forces consists of arresting and incarcerating alcoholics. For 1948, the Federal Bureau of Investigation reported that about a million and a quarter arrests for drunkenness were made in 1,654 cities,[1] and more than 76,000 arrests for drunken driving were made in that year.[1] There probably are about 3,000 fatal accidents each year—in traffic, in public, or at home—due to alcoholics.[8] In 1946, about 16% of all new admissions to mental institutions were for alcoholic psychoses.[1]

Despite the advances made in the field of alcoholism, many still hold a number of fallacious beliefs about alcohol. A large percentage of the public believes alcohol to be a stimulant; that alcohol will make one more alert, more energetic, stir up thinking, enliven the imagination, and stimulate sexual activities. These beliefs, of course, are incorrect. Every physiologist and pharmacologist knows that alcohol slows one down, for it is a depressant. It deadens pain, is an analgesic, reduces anxiety, and is a sedative. In sufficient amounts, it produces unconsciousness, and is an anesthetic and narcotic. Nearly all authorities agree that in no area does alcohol improve performance, whether it be heavy physical labor, precision work, administrative judgment, creative endeavor, or in the realm of sex.

Therefore, the first spoke in the wheel of rehabilitation of alcoholics in business and industry is to obtain the facts of alcoholism. Knowledge leads to understanding, and understanding is the foundation of every rehabilitation program. Haggard and Jellinek, of Yale University, are making outstanding contributions by promoting research in alcoholism and disseminating the findings of such research. The *Quarterly Journal of Studies on Alcohol*, edited by Haggard and Jellinek, is the leading scientific journal in the world dealing with alcoholism.

Alcoholism is considered to be a disease, and by many, a hopeless disease. So much has happened in the last 10 years that the future holds great promise. Thousands of alcoholics are fighting successfully against alcoholism, and thousands more could be doing so if given a little help.

WHEN an employer discovers one of his employees to be an alcoholic—and this is a common occurrence—this is *not* the time to dismiss the alcoholic. This *is* the time to extend to him the same understanding, sympathy, and *assistance* that would be offered to that employee if he had developed pneumonia or tuberculosis.

The second spoke in the wheel of rehabilitation is to recognize alcoholism as a disease, and the alcoholic as a sick person desperately in need of medical and psychological services.

Many have developed attitudes toward the alcoholic unpleasantly colored by past experiences. The tendency of the non-alcoholic is to be too intolerant of the alcoholic. Such rigidity of feeling forces the non-alcoholic to avoid and ostracize the alcoholic. At the time when the alcoholic needs help most, he is rejected and humiliated.

To a great extent, the drinking of many potential alcoholics is encouraged by society. Rare indeed is the newspaper or magazine that can resist selling its space for liquor advertisements. The highways are covered with billboards of seductive females sipping tall, cool glasses of beer. Drinking scenes are common on screen and stage. There is a steady bombardment of visual and auditory stimuli so patterned as to arouse the appetites and desires for alcoholic beverages, together with the companionship and prestige supposedly associated with drinking situations. Radio broadcasts of sports events, listened to by thousands of adolescents, advertise the sale of malt beverages. Strong social pressures operate to stimulate the use of alcoholic drinks.

Then, when friends or relatives or employees step out of line, society becomes indignant, and condemns and punishes the transgressor with severity. We push each other toward the precipice of alcoholism, and when one of us falls over, we call him names, lock him up in a drunk tank, or fire him from his job. Montaigne wrote a line in his *Essay on Drunkenness* which is appropriate: "Every man weighs down his neighbor's sins, and makes light of his own."

The ambivalent responses of society to the alcoholic and alcoholism are clear indications of society's confused thoughts and feelings in these areas. This is a shortcoming which must be recognized before more humane and scientific approaches to these problems can be developed and used.

Spoke number three is to develop tolerance and sincerity toward the alcoholic, motivated by desires to be helpful. The alcoholic needs friends; he needs help. Give him a lift instead of a shove.

THE question often is asked: how can one recognize the alcoholic? It is not difficult for the layman to note the damaging effects of prolonged drinking. The man on the street knows there is something wrong when he sees his friend or brother, because of drinking, lose job after job, go into debt, disappear for weeks or months, break up home and marriage, become bitter and resentful towards himself and the rest of the world. Behavior such as this is characteristic of the alcoholic.

Far more valid are medico-psychiatric diagnoses which recognize both organic and functional elements in the alcoholic. Most alcoholics are compulsive drinkers with practically no control over their drinking. Their first drink seems to set off a chain reaction which demands more and more alcohol until the alcoholic reaches his

goal—the Nirvana of unconsciousness. As many an alcoholic knows, "one drink is too many and a thousand drinks not enough."

The social histories of alcoholics include family and marital troubles, financial difficulties, and occupational maladjustments. There often are frequent arrests, automobile accidents, other types of accidents, and a melange of various other peccadilloes.

Their medical histories reveal frequent periods of hospitalization—as well as many days spent in rest homes and sanitariums—for "nervous breakdowns" ostensibly, but actually to "dry out" and start afresh in their campaign against John Barleycorn. In the chronic alcoholic, the veteran of many years of battling with the bottle, there often will be physical and mental deterioration.

Another approach to the identification of the alcoholic, is through psychological testing. Manson[6,7,8] has found alcoholics to differ significantly from non-alcoholics in a number of personality characteristics. On the basis of these personality characteristics, a 10-minute paper-and-pencil test has been constructed which differentiates alcoholics from non-alcoholics. Another paper-and-pencil test devised by Manson[9] determines the extent of alcoholic habituation.

The fourth spoke in the wheel is the identification of the alcoholic in order to help him, and the fifth spoke in the wheel is the implementation of programs of rehabilitation. Vigorous efforts should be directed toward the objective of keeping alcoholics on the payrolls in productive capacities.

Although alcoholism is a public responsibility, and business and industry need not assume the full load of this costly burden, it is in their best interests to carry their full share and *more* of this responsibility. The backbone of any successful enterprise is healthy workers. Many a firm boasts of "looking after its own." Such a slogan is a good one, but it would be excellent if it also meant that such organizations also looked after their own alcoholic employees.

MORE business and industrial concerns need to develop rehabilitation programs for their alcoholics, but before such programs are made, plans based on surveys to determine the extent of alcoholism within the business or plant should be made. Usually, only a small percentage of employees will have serious problems; a larger percentage may have less serious problems which may later lead to trouble. Sometimes a company will claim that it has no alcoholic problem. It is refreshing to read the comments of Wittmer,[13] Vice-President in charge of industrial relations for the Consolidated Edison Company of New York: "We no longer belong to that category of employers which more or less insists that it 'has no alcoholic problems.' When that sweeping claim is made, a free translation would usually be, 'When a man's drinking begins to interfere with his work, we fire him—no matter how long he has been with us.' That is a simple and direct approach to the situation, but, in our considered opinion, it is not a sound, modern, economic or realistic attitude."

Rehabilitation programs in business and industry should stress strongly the prevention of alcoholism. This requires systematic and consistent educational efforts on the part of management. Foremen and supervisors need training in the facts of alcoholism. Too often they cover up their men, feeling that in this way they are of help. Actually, this may be damaging to the men they seek to protect. It is far better to recognize an alcoholic condition and do something about it, than keep it hidden for years, permitting a creeping form of demoralization to set in. Counselors often are needed to provide employees with the necessary information and guidance. In many cases, when a worker is given essential information which he recognizes and accepts, he makes the necessary adjustments chiefly through his own efforts.

The industrial physician who becomes aware of signs of early excessive drinking should bring them to the attention of management, after which individualized programs of prevention or treatment should be developed.

Personnel managers can play an important role in preventing alcoholism. Workers placed on jobs which are either too easy or too hard for them, often become dissatisfied or frustrated, and resort to excessive drinking. A worker on unfriendly relations with his fellow workers tends to be maladjusted, and may drink to overcome his shortcomings. Blind alley jobs with limited promotional opportunities, disagreeable work, and low interest jobs also drive men to drink. The personal problems of men and women frequently are contributing factors to alcoholism. Adequate recreational and social facilities are of great help in supplying workers with opportunities to satisfy their needs for relaxation and social participation. Personnel officers by more effective use of their techniques of selection, placement, training, and promotion can reduce alcoholism within their organizations. More vital human relationships between management and labor are indicated in these fields.

Beside preventing alcoholism, rehabilitation programs must reduce the extent of alcoholism in existence within their domains. This is done by treating the alcoholic medically and psychologically. The treatment of organic conditions—often concomitant with emotional factors—complicates the management of alcoholism. Such treatment, of course, is a medical problem. It is for the physician to determine if conditioned reflex or antabuse therapy is necessary before psychotherapy can be started.

The alcoholic does not respond well to pleadings, threats, lay-offs, or even work dismissals. He needs to clarify and eliminate, or control his emotional and mental disturbances. He should

see himself as he really is, recognize his limitations and work within his capacities. When he understands the nature of his obsessive thoughts and compulsive acts, he may learn to live a life of total sobriety. For the alcoholic, it is most important that he accepts the need for a life free of alcohol. In brief, he needs the services of therapists trained and skilled in working with alcoholics.

Business and industry should use the resources of Alcoholics Anonymous to a greater extent than they are now doing. Alcoholics Anonymous has proved effective in the rehabilitation of thousands of alcoholics. Several industrial plants have found it worthwhile to include members of Alcoholics Anonymous on their payrolls as personnel counselors. Other community resources—physicians, hospitals, schools, social agencies, therapists—also should be used. The Eastman Kodak Company[2] has found such resources valuable in their rehabilitation program.

In the Dupont[2] program, it was found that 65% of the group treated by the medical staff had become members of Alcoholics Anonymous. During 1949, the Allis-Chalmers Manufacturing Company[3] installed a full-time counseling program for problem drinkers and their supervisors, under the guidance of a member of Alcoholics Anonymous. After a year, Walter Geist, president of Allis-Chalmers, reported the program a success. It had reduced lost working time, reduced lost wages, reduced drinking, and saved many experienced workers for the company.

In addition to preventing and reducing alcoholism, business and industry need to alleviate the distressing results of chronic alcoholism. Means of doing so would include adequate medical and psychiatric services, hospitalization, institutionalization, and retirement measures.

WHAT are the costs of rehabilitation programs? In 1945, it was estimated[11] that the costs per alcoholic per year were between $30 and $60. Suppose these estimates were doubled so that costs of rehabilitation per alcoholic per year were from $60 to $100. Even then, from the long range point of view, rehabilitation programs would be of great economic value.

Various types of rehabilitation programs are now in operation. The Consolidated Edison Company of New York, employing 30,000 employees, recognizes alcoholism as a disease and makes retirement provisions for its chronic alcoholics of long standing. E. I. du Pont de Nemours & Company has operated a program since 1943, and it claims to have salvaged more than 100 valued employees. Eastman Kodak Company has a program. In Wisconsin more than a dozen large organizations have recognized alcoholism as an industrial problem, and are cooperating with the Yale Plan Group in working out rehabilitation programs. In 1949, several industrial institutes dealing with alcoholism were held in Houston, Chicago, and Rochester. Representatives of many nationally known companies attended these institutes. There are clear indications that enlightened leaders of business and industry are making definite plans to rehabilitate their alcoholic workers.

Summary

IN SUMMARY, on the basis of past experiences, it can be stated that sound rehabilitation programs can be expected to bring about the following results: *decreases* in tardiness, absenteeism, labor turnover, accidents, scrap losses, illness, medical costs, and pension costs; *increases* in morale, production, earnings for workers, earnings for business and industry, life span of workers, work spans of alcoholics.

Comprehensive and well planned programs of rehabilitation of alcoholics in business and industry will benefit the alcoholic, the family of the alcoholic, business, industry, the community and the nation.

From a mental hygiene point of view, a sound mind in a sound body in a sound society is the desideratum for alcoholics—as well as for non-alcoholics.

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The Psychological Evaluation of Alcoholics

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MOST persons do not resent too strongly belittling remarks about their abilities as clerks or teachers or executives; but they will argue strenuously if they are told that they are poor judges of human nature. Through a peculiar twist, most of us believe that all we need to do is to look at a person, ask a few questions, and we can determine intelligence, emotional stability, and work capacity. That is why most employers today continue to hire men chiefly through interview methods rather than by the more valid and reliable psychological testing techniques.

Although the layman may feel certain of his diagnostic and prognostic skills in the field of personality, the psychologist is rather reluctant to make predictions beyond the scope of his scientific experiences; he tends to be cautious in his professional judgments.

Researchers have carried out numerous studies of alcoholics in the belief that there may be elements in the personality make-up of the alcoholic which will—ultimately—explain this addiction. Although these studies have contributed greatly to our understanding of the alcoholic, no specific personality pattern of the alcoholic has been described which is widely accepted by clinicians. Probably, there are as many different kinds of alcoholics as there are alcoholics. This is to say that each alcoholic—as well as each one of us—is a unique personality. Nevertheless, it is possible to recognize characteristics of the *group* of alcoholics.

One often hears that those addicted are unusually gifted intellectually—or, on the other hand, that they are stupid. Several studies[2,3] of the intellectual powers of alcoholics indicate that they do have slightly higher average intelligence quotients than the general population. Does this mean that alcoholics are more intelligent than non-alcoholics? Not at all, for in these studies the alcoholics were not selected at random. They were hospital or sanitarium patients seeking treatment, and thus probably were a select group. It is more plausible to believe that if a random sample had been made, the range and mean of intelligence for alcoholics would have followed that of the general population. In other words, no higher percentages of superior or dull alcoholics would be found than exist in the general population. Most alcoholics are neither geniuses nor morons, but of average intelligence, with I.Q.'s between 90 and 110.

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It is generally believed that alcoholics, as a group, possess superior verbal fluency or, in the vernacular, a greater "gift of gab." Verbal fluency includes speed of evocation, freedom from restraint, richness of language, variety of ideas, facility in dealing with semantic relationships, and size of vocabulary. Insofar as size of vocabulary is concerned, alcoholic males were found[4] to have slightly larger vocabularies than non-alcoholic men, while female alcoholics had slightly smaller vocabularies than non-alcoholic women. The differences in size of vocabulary between alcoholics and non-alcoholics were not large, and not of statistical significance.

Although alcoholics and non-alcoholics are of comparable intelligence and vocabulary, there is a marked difference between these groups in the number of years of schooling completed.[1,4] Alcoholics complete approximately three years less education. Such a finding suggests that prior to the onset of alcoholism, that is, during the years of adolescence, personality and/or environmental factors are operating which may be involved in the development of alcoholism. Further studies of adolescent drinkers are needed to explore this finding.

The personality of the alcoholic has been studied in many ways: psychoanalysts have delved into his unconscious processes, while psychologists have observed his conscious behavior. The ancestry of the alcoholic, his infancy and childhood, his early family life, his marital and sexual life, and his institutional life have been studied. Psychologists have administered subjective, objective, and projective tests of every description to alcoholics in hospitals, clinics, guidance centers, prisons, flophouses and penthouses. Alcoholics have been studied individually and in groups, when they were stone sober, busy drinking, groaning with hangovers, and in their hallucinating moments.

The Rorschach—the projective ink-blot test—has not revealed clear or persistent personality pictures of alcoholics. A recent study by Buhler and Lefever[5] sets the alcoholic apart from the psychoneurotic and the psychopath in the following manner: the alcoholic cannot tolerate too much tension or pressure; at the same time he worries a great deal. The psychoneurotic can stand tension and also worries considerably. The psychopath neither can stand pressure nor does he show anxiety. Other Rorschach studies describe the alcoholic as having high aspirations but limited accomplishments, rich imagination, poor poise and stability, strong to violent emotional forces, unreasoning demands for happiness

and excitement. He seems unable to adjust to reality, is emotionally disturbed, immature, impulsive, and under emotional rather than intellectual control. He reveals a good deal of sexual maladjustment.

Wittman,[9] using objective personality tests, describes the alcoholic group as characterized by:

1. A domineering but idealized mother and a stern autocratic father, whom the alcoholic feared as a child.
2. A marked degree of strict unquestioning obedience demanded in family life, with little freedom allowed.
3. A feeling of insecurity as evidenced by an insistent feeling of need for religious security and a strong feeling of sin and guilt.
4. Marked interest in the opposite sex, with many love affairs, but poor marital adjustment.
5. Lack of self-consciousness with marked ability to get along with, and be socially acceptable to, others.
6. Occasional depression and periods of marked unhappiness.
7. A keyed-up emotional level, with work done under high nervous tension.
8. A definitely expressed and disproportionately greater love of the mother.

The writer[5] has found alcoholics to differ significantly from non-alcoholics in the following traits:

1. *Anxiety.* Alcoholics have an excessive number of fears, worries, feelings of insecurity and inadequacy, undue concern over their health, and easy fatigability. The presence of anxiety in alcoholics, of course, has been widely recognized.
2. *Depressive fluctuation.* Alcoholics shift easily toward depressed states. Their mood swings are from normal to slightly depressed conditions to much deeper depressed states. They appear to become easily depressed, often become sad, and are subject to quick and frequent disappointments.
3. *Emotional sensitivity.* Alcoholics are sensitive, highly emotional, shy, "touchy" and reveal a need for protection from emotional situations. They appear to be emotionally inadequate yet hypersensitive. At the same time, alcoholics have not developed the protective adjustment mechanism acquired by other sensitive people.
4. *Resentments.* The alcoholic develops deep and bitter resentments, shows some paranoid characteristics, and feels that others may be responsible for his shortcomings. He is easily irritated, and appears to carry a chip on his shoulder.
5. *Incompletion.* Alcoholics appear to have had a series of failures in the completion of socially accepted objectives, such as obtaining a formal education, learning a trade or life work, working steadily, making satisfactory marital adjustments, participating in community life, or developing a life philosophy and ethical code. This inability to complete such objectives points toward restlessness, unsteadiness, mobility, and desire for frequent changes. The alcoholic appears to be confused in his thinking, regards his life as unsatisfactory, feels he has not lived up to expectations, and has no strong ties to his work, family, social life, or religion. In many ways, he is an incomplete personality in the sense that he does not carry through successfully those activities which most well-adjusted persons achieve.
6. *Aloneness.* Alcoholics seem to feel that they are alone in the world, that there are barriers between them and non-alcoholics. They feel alone even in the company of others. This may account for the resistance encountered by non-alcoholics who attempt to work with alcoholics in therapy situations. The alcoholic appears to be undersocialized, perhaps afraid of society.
7. *Interpersonal relationships.* Alcoholics reveal many failures in the development of strong emotional ties with their families. Even as children they made poor home adjustments. Apparently alcoholics lack close emotional and personal ties. In many cases there has been parental rejection of the alcoholics, resulting in shallow and weak interpersonal relationships.

SINCE differences between the alcoholic and the non-alcoholic can be recognized, is it possible to construct a test which will identify the alcoholic personality? The use of such a test might serve a number of purposes. For example, it would save considerable time. It is not difficult for the physician or therapist to make a clinical diagnosis of alcoholic addiction. An adequate history may be sufficient to establish a clear pattern of inebriety. Such diagnoses require time-consuming consultations, histories, and examinations. In large organizations such as the military services, the Veterans Administration, state hospitals and prisons, general hospitals and clinics, and medical departments of large industrial concerns, the conservation of personnel and time is often of the greatest importance. If only for these economies, a brief, objective, paper-and-pencil test for the differentiation of the alcoholic from the non-alcoholic would prove to be a valuable diagnostic and therapeutic adjuvant.

Another cogent use for such an instrument would be the objective reinforcement of the clinical diagnosis of alcoholic addiction. Many problem drinkers stubbornly refuse to recognize their inability to cope with alcohol, although any impartial observer would readily recognize the problem. In such cases, "test results" confirming the clinical observations often are helpful in facilitating insight in those alcoholic patients seeking assistance for other problems.

It is of great therapeutic importance to recognize the conditions of pathological drinking, for then, total abstinence is indicated, and moderate or social drinking is contra-indicated. Once the diagnosis of alcoholic addiction is made, if drinking continues, the prognosis is practically hopeless. Jellinek says: "There is unanimity among

therapists that in the course of treatment (for alcoholic addiction) absolute abstinence must be maintained and, with very few exceptions, therapists also agree that the patient must become a total abstainer and that he cannot be trained to become a social drinker."

At least three tests have been made for the identification of alcoholics. The first one was constructed by Seliger[7] and is called "The Liquor Test." It contains 35 questions to be answered "yes" or "no," and the items appear to be valid. A single "yes" response is indicative of a serious drinking problem. Apparently these responses are interpreted subjectively and empirically. Seliger, in three separate descriptions of his test, does not present his experimental data, validating criteria, or the reliability of the test.

A second test, called the Manson Evaluation,[5,8] contains 72 questions, all remotely associated with drinking, and of the type found in many objective personality tests. This test evaluates seven traits frequently noted in alcoholics, and infrequently noted in non-alcoholics: anxiety, depressive fluctuations, emotional sensitivity, resentment, incompletion, aloneness, and interpersonal relationships. In a sample of 571 alcoholic and non-alcoholic subjects, 79% correct predictions were made of the males, and 84% of the females. This test has reliability coefficient of correlation of .94.

The third test, called the "Alcadd Test,"[6,8] or alcoholic addiction test, contains 60 questions to be answered "yes" or "no." All the items are frank drinking items. This test is administered best in a clinical situation where good rapport has been established. Under such conditions, in a sample of 282 cases, 97% correct predictions of alcoholics, 94% of social drinkers, and 100% of abstainers were made. This test has a reliability coefficient of correlation of .92 for males and .96 for females. This test measures five traits of alcoholic behavior frequently found in alcoholics. These are regularity of drinking, preference for drinking over other activities, lack of controlled drinking, rationalization of drinking, and excessive emotionality.

The Manson Evaluation and the Alcadd Test can be completed in from 10-15 minutes, scored and profiled in less than five minutes. The profile will present the subject's strengths and weaknesses, insofar as the traits measured are concerned.

Conclusions

IN CONCLUSION, two points have been made:

1. Personality differences between alcoholics and non-alcoholics have been recognized.

2. Psychological tests have been developed for the differentiation of alcoholics from non-alcoholics and for the determination of alcoholic addiction.

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Enough

I HAVE the deepest concern for the welfare of the true silicotic and the tuberculosilicosis victim. I feel our industrial hygiene and compensation laws should keep pace and remain in line with our true knowledge of the genesis of this disease. For this reason I violently object to the hasty and indiscriminate dumping of cardiacs, asthmatics and chronic coughers with emphysema into this select group of victims of civilization.

—From "Diagnosis of Silicosis," by KENNETH M. SODERSTROM, M.D., in *Northwest Medicine*, December, 1950.

Physical Examination in Industry as a Cancer Case-Finding Procedure

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PHYSICAL examinations in industry are for special purposes, such as (1) the selection and placement of people at the time of employment and after absence from work for various reasons; (2) early diagnosis of occupational diseases; (3) estimations of disability in claims for compensation; (4) health maintenance; (5) case finding in special disease-control programs; and (6) consultations with employees.

For each of these purposes there is a routine, and rarely does it cover all parts and functions of the body. In employment and placement, the examination is for recognition and estimation of handicaps and capacities, as well as knowledge and skills. Examinations after absence from work may be limited to questions, with perhaps a casual inspection, depending on the length of absence and the reason for it. The extent is left to the judgment of the physician.

In the early diagnosis of occupational disease, the examination is one that will show the presence, absence, or improvement of the disease process. It, too, may be limited, seeking only evidence of a specified occupational disease known to be possible through employment exposure. In some instances, it may be restricted to laboratory tests only. For disability estimations, it may concern only the part or parts affected.

The health examination is designed to assist employees in keeping well and employable, and to aid them in obtaining treatment early from their family physicians if that is needed. The extent to which a physician carries on such an examination will be suggested to him by the symptoms offered or the employee's record of complaints. It is usually made periodically, sometimes annually, but more frequently every other year, and sometimes not that often.

Case-finding examinations are limited, and may consist only of laboratory work. They are usually furnished by agencies outside of industry. Within the last two or three years, however, some industrial physicians have made special efforts in the early detection of diseases of the heart, cancer of the lung, and other diseases of a non-occupational nature but nevertheless productive of disability which severely impairs working capacity.

It appears, then, that routine physical examinations in industry do not offer unusual opportunities for cancer detection. Skin and other superficial malignancies may be found in one fashion or another. Cancers of occupational origin are carefully sought after and usually found early. But, generally speaking, an industrial physical examination cannot give sufficient attention to the areas most frequently involved with cancer—the stomach and prostate in men, and the breast and cervix in women. The industrial examination is, however, contributing increasingly to the early recognition of lung cancer through use of chest x-rays as a routine feature of the examination.

Despite the limitations of examinations in industry, there are three ways by which early cancer detection can be promoted in industrial medical departments: (1) through the fine relationship which exists between industrial physicians and the employees served by them, (2) by an industrial adaptation of certain features of the Hillsdale Plan for cancer detection, and (3) in the use of health education.

Employee-Physician Relationship. The opportunities of industrial physicians to counsel with employees are enjoyed to a like extent by few physicians outside of industrial practice. It is not unusual, for example, for employees to make one or two visits to the medical department each month. In a plant employing 10,000 people this custom would therefore provide the plant physician and his staff with 10,000 to 20,000 employee contacts each month, each one of which is of a personal and sometimes of an intimate nature. Through the record which is kept of services of this kind, it becomes quickly evident that certain employees are suffering from conditions that require close study and perhaps active treatment by their family doctors. For example, one man comes in with symptoms of indigestion, and asks for soda bicarbonate. When this has happened a certain number of times, the nurse or physician who has seen him decides that a study of the case is in order. It is studied, x-rays are taken, and a malignancy is found. An operation is obtained early enough so that prospects for a cure are reasonably good. Such was an actual case, yet various examinations received by the patient failed to indicate what was occurring, while the record led to a study that did. This case illustrates what is happening in industrial medical departments, and how routine services lead eventually to the discovery of malignancies earlier than had they come to their own doctors later on. It must be admitted that procedures of this kind do not rate as early detection procedures.

The Hillsdale Plan for Cancer Detection. It may be that industry's contribution brought about in this fashion is sufficient, but the success

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of the Hillsdale Plan for tumor detection suggests that even greater successes can be obtained in industry if the plan can be integrated into routine industrial medical services. The purpose of the Hillsdale Plan, established by a group of practicing physicians in Hillsdale County, Michigan, is to encourage the people of the County voluntarily to request cancer examinations from their family physicians. The examination, given by the physician in his office at the regular office fee, is a complete physical examination with special attention to those sites where cancer is most frequently found. It includes whatever supplemental services the physician believes indicated, such as x-ray, biopsy, and laboratory studies. The names of the patients enrolling, together with a report of the findings, are sent to the local health department, thus providing the basis for a cancer register.

Of course, this would mean that every industrial medical department is potentially a cancer-detection center. There are, however, certain cases, especially in women, where the plant physician cannot go so far. There would be too much criticism if, for instance, every woman in the plant had a vaginal examination or an examination of the breast. Industrial physicians cannot do this sort of thing, but they can follow up leads brought about by studies of the records and requests for service or advice from the employees. If they are not in a position to make the examinations themselves, they can send the employees to their own physicians, as provided in the Hillsdale Plan. In that way industrial medicine becomes a feeder for practitioners who are participating in cancer detection. Incidentally, this same routine results in fairly early discovery of other chronic diseases, such as diabetes and heart disease.

Health Education. There is a third way in which industrial medical departments can be helpful in the promotion of cancer control, and that is through education. Dr. Joseph S. Devitt, of Milwaukee, for example, has discussed cancer in an employees' magazine, and I believe that his contribution is sufficiently important to justify a complete quotation*:

"In this year alone 200,000 persons are, with cold, statistical certainty, going to die of one single disease—cancer.

"Not a very pleasant thing to think about, is it? Can't something be done?

"My answer is 'Yes, something can be done—maybe.' And the 'maybe' depends in large part on each one of us who may become a victim.

"At least half the folks who will die of cancer this year failed to help themselves in one of these ways: (1) they failed to heed their symptoms of cancer; (2) they failed to have the courage to tell their physician of the symptoms; or (3) they failed to learn the symptoms.

"'But,' you might say, 'We're not doctors. How can we recognize the symptoms of cancer?'

"Here's how—by simply remembering that any of the following may mean cancer:

1. A lump anywhere in the body, especially if it is growing.
2. A sore which does not heal.
3. Continued indigestion or loss of appetite.
4. A change in bowel habits.
5. Bleeding from any body opening, such as the rectum, etc.
6. Chronic cough, hoarseness.
7. Difficulty in swallowing.

"If you will look back at the paragraph coming just before this list of seven cancer symptoms, you'll see that I said these symptoms may mean cancer. Other diseases besides cancer may cause any of these symptoms—and this is important to remember because it is the job of the doctor, once he knows about the symptoms, to search carefully and thoroughly and find out what diseases are causing them.

"You've got to cooperate with him in this job. Tell him about your complaints within a week or two after they begin. This may mean the difference between life and death for you.

"Far too many still labor under two very mistaken ideas about cancer. Their first mistaken idea is that a diagnosis of cancer amounts to a death warrant. Their second mistaken idea about cancer is that it sneaks up on a victim and develops to the stage where it can't be cured before it produces symptoms.

"Let's debunk these two phony impressions right now. Many cancers are being cured every day by operation, x-ray, or radium—but not by anything else. Keep away from the salves, colored lights, or grandma's vinegar and milk poultices—they won't help you a bit. Let your common sense take hold so you can look at the disease clearly; cancer practically always, in its curable stages, produces one or more of the seven warnings. And take cheer in knowing that if cancer is diagnosed early, it can be cured. But only you can give the doctor the chance to make an early diagnosis. Keep alert regarding the symptoms. It's up to you."

INDUSTRIAL medical examinations are highly specialized and can only be used for the early detection of cancer through the incidentals and by-products coming out of the examination. It is suggested, however, that the day-to-day contacts in a plant between doctor and employee bring out leads which direct the physician's attention to possibilities of the early diagnosis of malignancies. Employees may then be examined by the plant physician, but probably will be referred to their own family physician or others who are participating in the cancer-detection program. Education as carried on by many industrial physicians can be most helpful in attracting employees needing early diagnosis to consult physicians in the plants, whereupon they can be referred to their own doctors for subsequent study and treatment.

*GM Folks, 15:10 (Sept.) 1950.

Industrial Intoxication Due to Pentachlorophenol

PROF. DR. DR.H.C. E. W. BAADER
Director of the Klinik fur Berufskrankheiten
Hamm / Westfalen
and
DR. MED. H. J. BAUER
Neurological Clinic of the University of Hamburg
(Director: Prof. Dr. H. Pette)

OF THE halogenated derivatives of benzol, pentachlorophenol is becoming increasingly important as an insecticide and fungicide. Along with its sodium and potassium salts it is being used extensively to impregnate wood, leather, paper, paints, and glues as a protective medium against the action of bacteria, moulds, algae, and insects. For this purpose pentachlorophenol possesses a number of advantages: it is a potent insecticide and fungicide, with an antiseptic action 50 times stronger than that of phenol (Ehrlich and Bechold), is inexpensive, fairly insoluble in water and has a low vapor pressure (Fairhall).

In the technical production of pentachlorophenol, chlorine and partially chlorinated benzol are vaporized and brought to reaction in a quartz tube. The reaction product is finely dispersed hexachlorobenzol, hydrogen chloride, and chlorine. Hexachlorobenzol is extracted and mixed with sodium hydroxide, with which it reacts at a temperature of 240° C to form the sodium salt of pentachlorophenol. Free pentachlorophenol is obtained by the reaction of the sodium salt with dilute hydrochloric acid. The final product is centrifugalized, dried, and filled into barrels. Fig. 1 is a schematic illustration of the production process.

Our attention was focused on the industrial hazards involved in the production method described by compensation claims of 10 to 17 workers employed in the pentachlorophenol production department of a west-German plant.*

To our knowledge, industrial intoxications of the type described in this paper have not been published previously, although a number of authors, notably Americans, have pointed out this industrial hazard, and performed animal experiments to study the toxicology of pentachlorophenol.

All of the workers gave a case history of severe skin eruptions and furunculosis. All but one still showed definite signs of extensive acne more than a year after discontinuation of production. Eight of 10 men examined gave a clear-cut history of neuralgic pain of the lower extremities in the course of their skin disorders or (one case) shortly before. Four still complained of bronchitis, which had been quite severe in seven during pentachlorophenol production. In addition to these complaints, various other disorders were reported.

The department in question had been engaged in the production of pentachlorophenol from August, 1948, until February, 1949. In addition to this substance, there had also been some experimentation in the production of trichlorophenol. No further production took place since February, 1949, and with the exception of a certain amount of contact which some of the workers had with pentachlorophenol and associated products in the transfer of machinery and apparatus, none of the workers had contact with other noxious products later.

A distinction must be made between the symptoms due to irritation of the upper respiratory

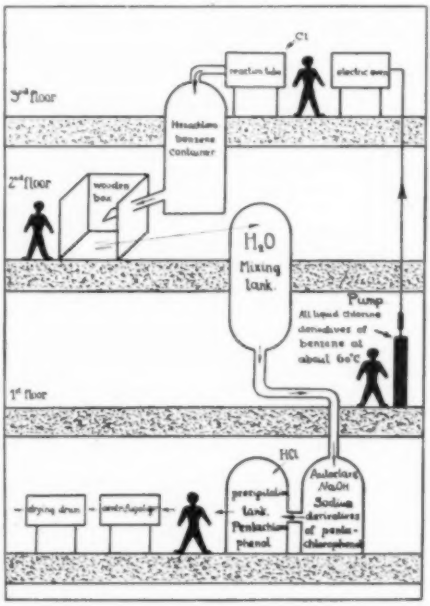

Fig. 1.
Schematic illustration of pentachlorophenol production process.

*Dr. med. O. BRINKMANN of the department of the State Industrial Physician (Staatlicher Gewerbearzt) of Westphalia-Lippe also examined the cases in question and arrived at similar results as the authors. The problem of industrial pentachlorophenol intoxication was discussed at the last meeting of German industrial physicians at Hamm/Westph. on October 25, 1950, by Brinkmann and one of us (Bauer).

Fig. 2.

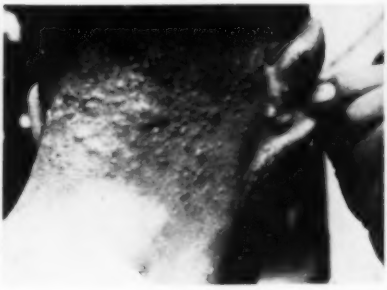

Fig. 3

Fig. 4.

passages and the eyes, which occurred during exposure, and usually subsided in the course of a few hours, and the chronic disorders, most of which began or reached their greatest severity weeks, or even months, following exposure. All of the men complained of irritation of the eyes with pronounced lacrimation, irritation of the nasal mucosae, coughing, sneezing, and chest oppression during work. Chronic bronchitis developed in seven of the cases mentioned, and subsided in all but two cases within a few weeks following discontinuation of production.

The first signs of acne were reported by the foreman of the plant in December, 1948, almost five months after the beginning of pentachlorophenol production. No new cases occurred until February, 1949, when four other workers began to develop an acne. The other five workers, i.e., one-half of the men examined, did not notice any skin eruption while engaged in the production process. In these, first signs of a skin disorder appeared in March (one case), April (three cases), and May (one case) of 1949.

According to their own case histories, medical records, which were available in all cases, and findings at the time of examination by the authors (June, 1950), all workers presented essentially the same disorder: an acne disseminata punctata with varying degrees of secondary pustular infection, small and large furuncles, brown pigmentation, and some cicatrization. In all cases, the skin disorder was most severe during the spring and summer of 1949. More than a year later, however, four of the workers still had severe degrees of acne, and four others still showed definite signs of the disease. In one case, the remaining acne lesions were slight, and in only one of the men had the condition cleared up completely.

Eight of the 10 workers examined gave a case history of neuralgic pain of the lower extremities. In one case, this disorder began almost three months before the first signs of acne; in all others, it occurred simultaneously with the skin eruptions or weeks to months later. In all cases, the condition is referred to as neuritis or sciatica by the examining physician. In descriptions of the condition, weakness of the lower limbs, paresthesias, severe pain of the gluteal and femoral region and along the course of the sciatic nerve are mentioned. Unfortunately, no detailed analysis of sensibility and reflexes was made. Since the present examination revealed no definite signs of neuritis in a neurologic sense in any of the workers, we prefer to leave the question open as to whether neuritis or neuralgia is the more appropriate term to describe the painful condition experienced by the pentachlorophenol workers.

A number of other disorders were registered, of which heart complaints (palpitation, shortness of breath) in four cases, disturbances of libido (four cases) and, curiously, bursitis of the elbow (four cases) merit mention. For the last mentioned condition, work histories of the patients in question afforded no mechanical explanation.

No laboratory studies were conducted during exposure or at the period of maximum development of the disorders described. Present examinations gave no conspicuous results. A slight increase of the blood sedimentation rate in six of the 10 cases, with values ranging from 11 to 24 mm, according to the Westergren method, was associated with the acne condition still prevailing. Examination of the urine revealed traces of albumin in two cases, one of which was diagnosed as a chronic nephritis, possibly due to anti-syphilitic medication. There was a slight increase of the $CaCl_2$-coagulation threshold in four cases, positive thymol turbidity test in one of these and two additional ones. Moderate anemia, without conspicuous color index shifts, was found in two cases. The white blood count revealed moderate degrees of leucocytosis not exceeding 12,100 in four cases. Differential counts were inconspicuous. Summarily, it may be said that the laboratory results yielded no new aspects of essential importance.

In an evaluation of the disorders described, there is no question of the relation between the work performed and the irritation of the eyes and upper respiratory passages occurring during exposure. The subsequent occurrence of the same type of skin eruptions in all of the workers involved in the production of pentachlorophenol,

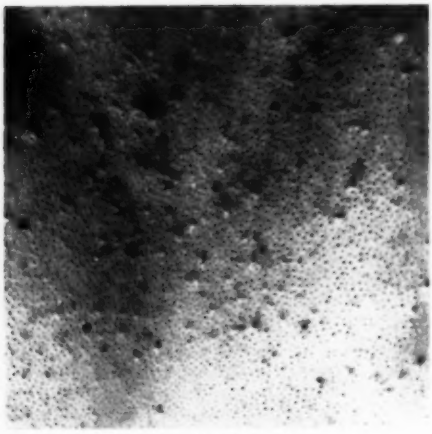

Fig. 5.
Skin eruptions in pentachlorophenol workers.

Fig. 6.
Bursitis of elbow in pentachlorophenol worker.

and the occurrence of neuralgic conditions of the lower extremities in eight of 10 workers points to a definite connection between the exposure to pentachlorophenol and/or its intermediary products. Whether the other disorders mentioned are also attributable to a noxious action of chemical substances encountered during work may not be decided beyond a certain degree of probability on the basis of available data.

While it is impossible to rule out the action of other intermediary products (monochlorobenzol) completely, the conditions of work point strongly to the dominating role of pentachlorophenol and hexachlorobenzol in producing the disorders described. In some of the workers, technical experimentation involving trichlorophenol and tetrachlorobenzol may also have played a role; however, all of these men spent most of their time in the production of pentachlorophenol.

Figs. 2-6 are photographs of the skin disorders found in all, and Fig. 6 shows the bursitis which was present in four, of the pentachlorophenol workers.

Experimental Data

VON OETTINGEN has summarized the literature on the halogenated derivatives of phenol in Bulletin No. 190 of the National Institute of Health. Quoting the results of Deichmann, Machle, Kitzmiller and Thomas in rabbits, he states that pentachlorophenol is readily absorbed through the skin and from the gastro-intestinal tract. Absorption studies indicate that it is distributed throughout the entire organism, and that within the limits of the dosage employed by the authors quoted, 70% are excreted essentially within 24 hours with the urine, and 9% are metabolized. Other studies employing intraperitoneal injection in rats yielded higher percentages of metabolization. It is pointed out that, in contrast to phenol, pentachlorophenol is not conjugated with sulfuric or glucuronic acid.

The application of pentachlorophenol to the skin resulted in extensive local damage, the intensity of which was determined in part by the solvents used.

The experimental administration of pentachlorophenol produces central depression followed by an increase in respiratory rate and volume, increased pulse rate associated with a primary rise and subsequent fall of blood pressure, progressive neuromuscular weakness, and terminal rise of body temperature. The glycogen contents of the liver are depleted, suggesting that final convulsive seizures may be due to hypoglycemia. There is increased peristalsis and diuresis, later oliguria. In fatal poisoning, heart failure is the cause of death.

In chronic pentachlorophenol poisoning the animals became listless, defecated frequently, became less active, showed slight motor weakness and, prior to death, convulsive seizures.

Pathological examination revealed marked rigor mortis, extensive damage to the cardiovascular system, especially the small vessels, swollen thymus, dilatation of the heart, congestion of the lungs, trachea and bronchi enlarged hyperemic and sometimes edematous liver, congested kidneys and hemorrhages, leucocytic infiltration, and albuminous fatty degeneration. The brain and spinal cord showed slight chromatolysis of nerve cells and diffuse areas of lymphocytic and mononuclear infiltration on histological examination (Kehoe, Deichmann, Gruebler, Kitzmiller, Thomas, Boyd, McGavack, Terranova, Piccione—quoted from von Oettingen).

Experiments on rabbits were conducted recently by the Gewerbehygienische Laboratorien of the Farbenfabriken Bayer, Elberfeld. Finely pulverized pentachlorophenol was applied to the

Fig. 7.
Left: Normal rabbit's ear. Right: Acne eruptions on rabbit's ear powdered 10 times with pentachlorophenol.

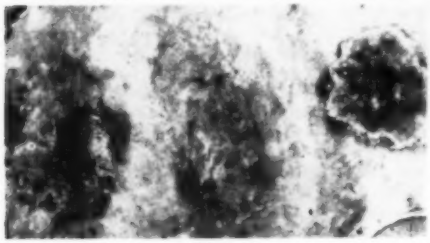

Fig. 8.
Skin of rabbit powdered with pentachlorophenol 11 days.

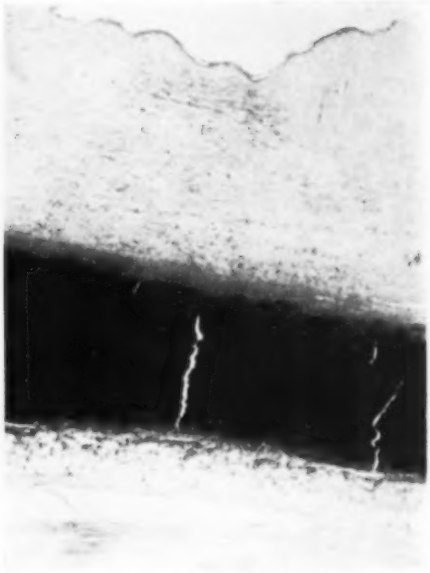

Fig. 9.
Skin of rabbit, dusted with pentachlorophenol. Histological section showing necrosis of subepithelial layers and massive leucocyte infiltration.

ears of the animals with a cotton swab daily for a period of 10 days. On the fourth to sixth day a slight erythema of the skin resulted; two to three days later, a pronounced swelling of the hair follicles was seen, which increased in intensity for some days following the discontinuation of pentachlorophenol application. Similar results were obtained with a 5% pentachlorophenol mixture with talcum (see Fig. 7).

Employing a similar technic on the shaved skin of rabbits, we could observe intense local irritation following the application of pulverized pentachlorophenol three to four days after exposure. The skin became red, and the veins dilated and prominent. Small excoriations developed in several places. In some areas, without signs of external injury of the skin, an infiltrated, brown-red, plateau-like area resembling tanned leather developed. Histological examination revealed extensive necrotic changes in the upper sub-epithelial layers. There was a massive accumulation of leucocytes immediately above the muscularis, suggestive of phlegmonosis. In other skin areas nodular infiltrations could be found. Our findings seem to coincide with the lesions described by Fairhall as the result of prolonged application of a 1% solution of pentachlorophenol to the skin (see Figs. 8-10).

Without a discussion of the extent to which secondary infection may have played a role in producing the lesions described, it seems essential that they could be produced by the gentle application of pentachlorophenol with a cotton swab, a procedure involving no mechanical injury of the skin.

Studies on the systemic effects of experimental pentachlorophenol intoxication produced in the manner described are still under way.

Comment

WHEREAS the animal experiments described are suggestive of a similarity in the mechanism of skin lesions produced experimentally to those occurring as the result of an occupational hazard in man, there is as yet no definite information available indicating that the systemic lesions found in animals parallel those found in man. The occupational cases presented in this study clearly indicate one thing, however, that pronounced systemic lesions do occur as the result of exposure to pentachlorophenol and related compounds. The clinical findings point to a striking similarity with the intoxications due to chlorinated naphthalenes (Perna-disease described by Teleky), in which typical skin changes designated as "chloracne" and identical with those found in our cases, neuralgic disorders, and damage to the liver may occur. The fact that skin lesions are not confined to the exposed areas, strongly suggests that the extensive alterations of this organ cannot be explained by mere contact. More plausible is the assumption that they

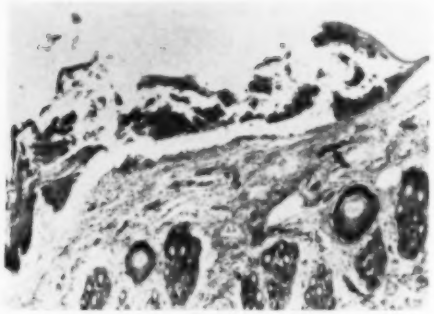

Fig. 10.
Same specimen as Fig. 9. Nodular infiltration in skin area dusted with pentachlorophenol.

are a partial (to be sure, the most conspicuous) manifestation of a general intoxication involving the internal organs as well. Assuming this, and considering the similarity to intoxications due to chlorinated naphthalenes, it seems important to consider the possible toxic effects on the liver. We are reminded of the occurrence of a number of fatal cases of toxic jaundice in workers exposed to chlorinated naphthalenes (Schwarz, Good and Pensky, Flinn and Jarvik, McLetchie and Robertson—quoted from Hamilton and Hardy). Whether the occurrence of neuralgic conditions is dependent upon toxic alterations of nerve tissue is still open to investigation. Results of animal experiments cited above (chromatolysis of nerve cells, lymphocytic and mononuclear infiltration) are strongly suggestive of such changes. For practical purposes in dealing with workers exposed to halogenated benzol- and phenol-derivatives, it seems well to consider this possibility in view of the present tendency to attribute all conditions resembling sciatica to mechanical alterations of the vertebral column. It is recalled that sciatica was the initial finding in one of our cases later developing the typical picture with generalized acne.

It has already been stressed that, in addition to pentachlorophenol, a number of other chlorinated benzol derivatives may have played a part in producing the clinical findings. On the evidence available at present, it is hard to assess the exact role played by one or the other of the chlorinated benzols and phenols involved. Considering the amounts of potentially hazardous substances involved, the results of animal experiments, and the similarity of the disease to the condition produced by highly chlorinated naphthalenes, however, we are inclined to consider pentachlorophenol as the noxious substance primarily responsible.

Summary

TEN cases of industrial intoxications due to pentachlorophenol are reviewed. An outline of the production process, results of animal experiments, and the clinical symptomatology, which is characterized by irritation of the mucosae and upper respiratory tract, neuralgic pain, and generalized acne of many months duration, are introduced.

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Connecticut Committee

THIRTY members were assigned to the committee by the House of Delegates. At the first meeting held in the State society building on May 24, 1950, DR. R. J. HINCHEY was appointed secretary and eight members were elected to the executive board: DRS. BARTON, CARTER, CLARKE, GRAY, KILGUS, PHARRIS, VESTAL, and YEAGER. Reports were discussed concerning publications, small plant industrial medical coverage, industrial dentistry, standard practices in methods of air sampling, multiphasic screening examinations, proposed industrial heart clinic at Yale, policies concerning workmen's compensation legislation, various meetings of medical and related professional groups, manufacturer's association and labor organization liaison activities, "ultrasonic noise" developments, alcoholism in industry, and section on occupational health plans. The formation of county committees on industrial health in five counties was reported, and it was agreed that the major effort of the committee this year would be to implement the development of county committees.

—From "Report of the Committee on Industrial Health," by JOHN N. GALLIVAN, M.D., Chairman, in *Connecticut State Med. J.*, May, 1951.

The A.M.A. Council on Industrial Health

JEAN SPENCER FELTON, M.D.

The Meeting at Oak Ridge, February 24

SEEKING newness in its meeting pattern, the Council on Industrial Health of the American Medical Association held a prelude session to its Annual Congress in Oak Ridge, Tennessee, on February 24, 1951. At the invitation of the Carbide and Carbon Chemicals Company, Union Carbide and Carbon Corporation, contractor-operator of the city's three large plants, the Council shared in an Orientation Program in Industrial Health Practices.

Attending as members of the A.M.A. Council were DRS. WARREN F. DRAPER, LLOYD E. HAMLIN, RUTHERFORD T. JOHNSTONE, ROBERT A. KEHOE, HENRY H. KESSLER, OSCAR A. SANDER, WILLIAM A. SAWYER, CLARENCE D. SELBY, and JAMES S. SIMMONS. Headquarters staff personnel included DR. CARL M. PETERSON, Secretary, and DR. J. F. MCCAHAN, Assistant Secretary of the Council, MR. HOWARD A. CARTER, Secretary of the Council on Physical Medicine and Rehabilitation, and MR. GEORGE W. COOLEY, of the Council on Medical Service. DR. EDWARD H. CARLETON, President of the American Association of Industrial Physicians and Surgeons, and DR. CREIGHTON BARKER, Executive Secretary of the Connecticut State Medical Society, completed the roster of guests, and DR. A. G. KAMMER, Medical Director of the Carbide and Carbon Chemicals Company, and DRS. RUSSELL L. HEINLEIN and C. R. YOLTON, Staff Physicians of the Oak Ridge National Laboratory, assisted in the program preparation.

The most modern in industrial health programs have been conceived and carried out at Oak Ridge's nuclear energy installations, and it was the desire of the Carbide executive and medical management personnel that the Council partake of these contemporary preventive medical ideologies. At the Oak Ridge National Laboratory, welcoming the visitors to East Tennessee, was CLARK E. CENTER, General Superintendent of the Company's atomic energy facilities. T. E. LANE, General Superintendent of the Industrial Relations Division, opened the program with a brief summary of "The Interest of the Industrial Relations Division in Industrial Health." Clarification of the functions of these plants was desired next as a backdrop against which the health activities could be silhouetted. DR. C. E. LARSON, Director of the Oak Ridge National Laboratory, a multi-purposed research institution, outlined the present objectives of this radioisotope-producing, developmental, and basic truth-seeking activity. The production program of the Gaseous Diffusion Plant was described by its Superintendent, W. B. HUMES, and W. D. LAVERS, Superintendent of the Electromagnetic Plant, summarized the contemporary role of that installation. Representing the Atomic Energy Commission's Office of Research and Medicine as its Medical Adviser, DR. E. H. RUCKER spoke of the interrelationships existing between the Oak Ridge Office of Operations and the plant medical departments.

Following a mid-morning coffee and doughnut refresher, the Medical Directors of the three facilities offered a *precis* picture of the health programs designed to answer the unique needs of industry's newest in operations. These presentations were made by DRS. C. R. SULLIVAN, JR., J. LYON, and J. S. FELTON, of the Electromagnetic Plant, the Gaseous Diffusion Plant, and the Oak Ridge National Laboratory, respectively. W. H. BAUMANN, Industrial Hygiene Engineer, illustrated the "Health Protective Measures for Beryllium Workers," and, simplifying a mathematics-laden task, H. J. MCALDUFF, JR., reviewed the Health Physics Program of the Laboratory. At morning's end, the dramatic film, "Engineering for Radioisotopes," was shown, demonstrating the role of the engineer in the design, construction, and operation of this country's largest isotope production center.

After satisfying the demands of the photographer, the Council had lunch at the Laboratory's cafeteria, and then toured the Health Division, where the operation of a modern dispensary was visualized from labor-saving clinical devices to the unusual in health education media. The source of the radioisotopes was visited, the Nuclear Reactor and Radioisotope area, and then, by bus, the Council viewed the expanding double- and triple-fenced installations of the production units at the Gaseous Diffusion and Electromagnetic plants.

Thus ended a capsule indoctrination into the medical ways and means of protecting the health of the atomic worker. In keeping with current underscorings, it was demonstrated that industrial health is an activity executed jointly by an interdependent team of physician, hygienist, and health physicist, whose capacity to perform is a result of managerial understanding and support. When supplied with the hand tools of their professions, when inculcated with the desire to render the best in preventive care, and when motivated by a true interest in people, then, and only then, can such a team carry the ideals of industrial health to unrealized heights.

This, the Council on Industrial Health saw in Oak Ridge.

The Meeting at Atlanta, February 25

IN AN EFFORT to improve communication methods among those interested in advancing the industrial health of this country, the first of a series of yearly meetings saw birth in Atlanta on February 25, 1951, as a preamble to the Eleventh Annual Congress on Industrial Health of the American Medical Association. Joining

with the Council were the following representatives of the Industrial Health Committees of 13 state medical societies:

Connecticut: DR. JOHN N. GALLIVAN, Chairman;
Florida: DR. G. FREDERICK OETJEN, Chairman;
Georgia: DR. C. N. WASDEN, Chairman;
Indiana: DR. EDWARD H. CARLETON;
Kentucky, DR. GRADY R. ROWNTREE, Chairman;
Louisiana: DR. JOSEPH SCOTT;
Michigan: DR. MAX R. BURNELL, Chairman;
Ohio: DR. LOUIS N. JENTGEN;
Oklahoma: DR. J. S. CHALMERS, Chairman;
Pennsylvania: DR. CHARLES-FRANCIS LONG, Chairman;
Rhode Island: DR. STANLEY SPRAGUE, Chairman;
Tennessee: DR. JEAN S. FELTON, Chairman; and
Wisconsin: DR. D. E. DORCHESTER, Chairman.

Council Activities

WITH DR. DORCHESTER, of Sturgeon Bay, Wisconsin, as Temporary Chairman, the session was opened by DR. CARL M. PETERSON, Secretary of the Council, who reviewed the activities of that body.

In substance, Dr. Peterson stated that the Council's efforts were based on a three-point program of Public Relations, Professional Relations, and Special Committee activities. The first is aimed at the establishment of a labor-management-medical relationship in industry, which theoretically should be the design for any future developments in industrial health but which, unfortunately, has so far met with little success. In Professional Relations, attempts are made by the Council to work through the professional groups encountered at state and county levels. In addition, activities are goaled toward a fusion of thinking of all participants in this specialty, such as nurses, industrial hygienists, engineers, chemists, and toxicologists. Separate committees aim at furthering study in workmen's compensation, rehabilitation, establishment of standards, and education and scientific development. It is the desire also, to effect an integration of all the committees so that mutual aid and full cross-ventilation will result.

Carrying on for the Council, DR. J. F. MCCAHAN indicated that this conference was the beginning in a continuing series wherein efforts will be directed toward a motivation of industrial health services and education at a community level. A draft of a guide for the use of state committees was presented, which outlined the logical steps that can be taken by these committees. Meetings of professional groups at a national, and even state level, it was pointed out by DR. MCCAHAN, have rarely advanced beyond the "talking stage." The need for cutting across all interested groups was stressed once more, and the guide provided a framework, it was believed, for the approach to labor, industry, medical societies, etc., in their orientation in industrial medical thinking.

Committee Activities

THE states' chairmen illustrated some of the present problems and trials connected with community level indoctrination. In one state, plant tours were successful in bringing the private physician into the industrial setting. Speakers versed in industry's medical problems talked at society meetings on surgery of the hand, back pain, and, more recently, on varicose veins and dermatologic conditions, but the number of such speakers was limited, and the demand could not be met.

The industrial health problems of the migrant laborer were discussed. A high incidence of syphilis among worker imports from the British West Indies, and of tuberculosis among Mexicans reaching Texas were contemporary situations demanding solution by physicians in industry and workers in public welfare. The migrant in need of obstetric care, and the itinerant laborer in cardiac failure were offering challenging questions in need of solution. The State Committee on Industrial Health could exert beneficial influence toward the passage of constructive legislative acts.

From out of the Middle West it was learned that a subcommittee on industrial relations of the State's Industrial Health Committee meets with industry, attorneys, and legislators in order to orient them in current medical developments. In the same area, cooperation with trade unions was good, and a bulletin had been published for industry, descriptive of the goals of pre-placement and annual physical examinations. Here, the State Chairman watchfully followed the work of the county committees, so that the position became one of function not title.

Council members introduced the interest of trade unions with the comment that certain labor leaders had asked industry to find jobs for physically limited workers. It was suggested further that some of the derogation of industrial medicine might be obviated by seeking the opinion of labor as to how they would go about the utilization of marginal personnel. In brief, the unions are becoming more medically conscious, want better physical examinations, but experience difficulty in meeting with the pertinent medical committees. The opposing side of labor opinion was seen, it was cited by one state representative, when certain locals actually fined their members $25.00 for having submitted to the taking of a chest film.

An important aspect of this subject is overlooked frequently, when the Council, or Board of Trustees of the state society is not familiarized with the objectives of the industrial health committee—objectives similar to those provided in the guide offered by DR. MCCAHAN. This is necessary so that when the Committee speaks, it speaks officially for the Society.

Additional goals to be reached include the creation of an industrial health committee in each county society, and the chairman of that

committee should be a member of the Council or Executive Committee of the state group. Secondly, all physicians engaged in industrial medicine, must be members of the County Medical Society—an objective not reached universally.

One state, strong in its committee's activities, has endeavored to build its county committees into meaningful functioning groups through orientation of the various boards of directors of the county societies in the dynamics of industrial health. It must be pointed out that the practitioner who has completed a single examination on a prospective industrial employee already has taken the first step into the practice of industrial medicine.

One of the country's greatest manufacturing states has several industrial health sub-committees carrying on such successful efforts as plant tours wherein the county society meeting becomes a dinner gathering, with a speaker, at the host plant. Another group has promulgated an annual industrial health day—a day devoted to outstanding speakers, and sponsored by the State Department of Health, the University, the State Medical Association, and the Association of Industrial Physicians. Another sub-committee keeps abreast of legislative activities, while another develops post-graduate courses. Research in industrial medicine is stimulated by the parent group, and meetings with labor unions are arranged to effect clarification of issues.

Somewhat differing activities were initiated in another state. Approval of standing orders for nurses in industry was requested of the State Society, and in order to learn of the scope of industrial health activities the Industrial Hygiene Division of the state conducted a survey. It was learned that fewer than 2% of the industrial organizations had the services of a physician or a nurse.

The committee has campaigned strongly for the reporting of occupational diseases. Sectional meetings on traumatic surgery by the American College of Surgery were sought, and a speaker on industrial medicine was added to the program of the annual meeting of the State Society, with a resultant request for a second speaker the following year. A successful statewide industrial health meeting had presidents of the state's industries in attendance, four nationally known speakers, and an audience of 120 persons.

It was emphasized repeatedly that speakers on industrial health must be good, for a poor platform performer will so quickly destroy interest in the subject matter. Whenever possible, one committee member believed, local talent should be used in county society programs.

As the meeting reached its end, opinions were solicited as to the worth of this type of gathering. Most of the state representatives thought the idea a good one, and the format a completely acceptable one. Repetitions of this initial joint thinking will be held, the frequency to be determined. To solidify the group, a permanent chairman was elected, and this honor went to DR. CHARLES-FRANCIS LONG, Medical Director, Bayuk Cigar Company, Philadelphia. DR. LONG promptly invited all State Committee members to communicate with him in reference to any problems that might appear in industrial health activities in these specific state society sub-groups.

It is of greater than passing interest that even though this meeting convened in the Southeastern area, there were but five representatives from the infra-Mason-Dixon Line region.

The scheme and theme of this initial forum were good. There should be a constantly close liaison between the industrial health committees and the parent AMA Council. The newsletter stemming from DR. MCCAHAN'S desk is informative, and aids greatly in lending cohesion to a Maine-to-California-wide body. If it is the activities of the local societies that will spread understanding of the objectives of health programs in industry, then let these media flourish —the newsletter, the joint session with the Council, and future visits of the PETERSON-MCCAHAN-HUSSEY headquarters staff.

BOOKS

Slough Service

THE SLOUGH INDUSTRIAL HEALTH SERVICE, Third Annual Report (1949-1950), Community Centre, Farnham Road, Sloughs, Bucks, England.

AMONG old-time craftsmen in the making of fine furniture, every apprentice before graduation was called upon to produce an "apprentice piece," proving his worthiness to acceptance among the artisans. Among industrial physicians many a fledgling, as a self-imposed task, feels impelled to write an eager article on "Industrial Medical Services for the Small Plant." Then he graduates and nothing is done about medical services for the small plant. No one has achieved the mechanism and discipline widely and practically adaptable for this nation's myriads of small work places. Our British neighbors, unsatisfied with paper plans, have set about a demonstration in the Slough Industrial Health Service. Now in its fourth year, the Council of Management provides its third annual report (1949-1950). Chiefly this small brochure represents the report of the Medical Director, DR. A. AUSTIN EAGGER. In straightforward manner this report portrays what has been done, on how many patients with specified conditions, derived from what sources, and at what cost. In addition to hospital services, preventive measures have been carried to the participating plants. The conclusion is inescapable that a superb service has been and is being rendered, to a daily inflow of 500 patients. Despite some 150 member participants within the community, it appears that the enterprise is not self-sustaining. Sources of numerous grants and gifts are mentioned. Perhaps a community activity of this character should not be expected to be sustaining. Industrial medicine is in some aspects a public health affair. Although industrial medicine in England is little entangled in its total program of

socialized medicine, there is incomplete opportunity to appraise the Slough accomplishments with what might be achieved through comparable activities in this country. It is believable that group small-plant medical services would seek full financial responsibility within its plant participants. This prospect is within reason, and might well represent a profitable venture. Withal the Slough experiment already demonstrates that the medical needs for small industrial plants do not constitute a hopeless phantasmagoria. We who merely write papers and wring hands in despair should move into action.

Ventilation

INDUSTRIAL VENTILATION: A Manual of Recommended Practice. American Conference of Governmental Industrial Hygienists, January, 1951. $2.00 (members), $3.00 (non-members). Available through, K. M. MORSE, Illinois State Health Department, 1800 W. Fillmore St., Chicago 12, Illinois.

IN THE early days of industrial hygiene engineering, distressing sums of money were expended on air exhaust systems designed and installed on a haphazard basis. Performance left much to be desired. Slowly and painfully this wrong has been eliminated. It is now possible to be right the first time. Enlarged experience culminates in this Manual of Industrial Ventilation which, only labelled as a manual of recommended practice, might have been marked as a manual of exactness. The preparing committee was not a group of mere editors: Instead so practical are they, that drafting room ink appears on their fingers, while duct metal shavings may be found in their pant cuffs. Their contributions may be found under such chapter headings as: "General Principles of Ventilation," "Dilution Ventilation," "Comfort Ventilation," "Hood Design," "Testing of Ventilation Systems," "Fans," and "Air Cleaning Devices."

It is recorded that when Ramazzini's historic book first appeared in Italy, it sold on the streets like a newspaper. When this Ventilation Manual first was shown to an assembled lot of industrial hygienists, it sold like an "extra" of a newspaper. The long awaited had arrived.

This is no book for the industrial physician. He would only be confused by its engineering exactness. For the plant engineer, the safety engineer, the ventilation engineer, the architect, and, above all, the industrial hygienist, it may be taken for granted that already he has a copy in hand or in prospect. But the contents of this Manual never may be taken for granted. It presents industrial ventilation at its best.

Executive Health

HEALTH EXAMINATIONS FOR EXECUTIVES. Prepared jointly by: The Medical Division, Health and Welfare Division, Policyholders Service Bureau, Metropolitan Life Insurance Company, 1951, Paper Brochure, pp. 59, Free.

IN INDUSTRIAL medicine there are no yearly new models. There may be continual improvement or instead there may be continuing neglect. On the improvement side is impetus to the health examinations for executives. This does not represent newness. What is new is the size of the collision between industrial medicine and the realization of past neglect of executive examinations. In any comprehensive industrial health program, equal opportunities should be extended the lowliest janitor and the highest executive. But it is a well-established practice that any and all workers in any hazardous work should be accorded particularized protective medical services. Long such have been extended to pliers of those occupations involving silica, lead or radioactive isotopes. Now comes the eye-opener that the executive is engaged in hazardous activities calling for health conservation of high order.

The Metropolitan Life Insurance Company has sighted the peculiarly perilous plight of the executive, and has filled this brochure with convictions that not possibly may be ignored. There is no other side to the story, and no rejoinders are in order. In 1950 this company provided 18,955 executive examinations in plants of all sizes from below 25 to over 500. The considerations that led to these examinations and the results therefrom constitute this report. What is an executive? This varies. In one plant all foremen and upward in the organization were examined. In another all persons paid salaries at or above $7,800 became executives. Likewise the scope of the examination varied as to age and situation, but always what was sought was sufficient information for a genuine appraisal. In general the recommendation is that the older the executive the oftener the examination. The quality of the commendable examination is reflected in the charges made. A near average cost per examination in one company is $85.00, but the maximum is $300.00, and the median is $30.00.

This brochure anticipates almost every need for information and almost every potential objection. It covers the desirability of confidential relations at all times, the nature of reports to be made to the company's medical director, acceptable types of forms, follow-up procedures, functions of the personal physician, approaches to the company's executives by its president, procedures in the examining clinic, summary of findings in selected instances, and statistical arrangements of significant observations.

The last section of the new brochure is devoted to a list of cooperating clinics by states. While these appear as the consulting clinics for the Metropolitan Company, it may be believed that in most instances the same clinics and individuals may be available to other organizations desiring high skill in the safeguarding of the executive's health.

Reconstructive Surgery

PEDICLE FLAPS IN PLASTIC SURGERY OF THE HEAD AND NECK. By GORDON B. NEW and JOHN B. ERICH. Published December 28, 1950, by Charles C. Thomas, Springfield, Illinois, $3.00.

THIS new monograph is well presented. The illustrations are excellent. While the descriptions on the whole are terse, they are inclusive and follow a pattern acceptable to those specializing in plastic surgery. The only exception would be the interjection of the term "shave" graft. The generally accepted nomenclature refers to this as a split-skin graft, which the reviewer feels should be used in order to avoid confusion.

This will be a useful reference book that should be in the library of every surgeon doing reconstructive surgery of the face and neck.

—PAUL W. GREELEY, M.D.

ASSOCIATION NEWS

Approval of Medical Services in Industry

THE AMERICAN FOUNDATION OF OCCUPATIONAL HEALTH on May 1 took over the evaluation and approval of medical services in industry conducted by the American College of Surgeons for the past 20 years. The FOUNDATION is setting up an advisory board to help direct the new project. On this board will be three representatives each from the INDUSTRIAL MEDICAL ASSOCIATION (formerly the American Association of Industrial Physicians and Surgeons) and from the donors to the project; two each from outstanding business executives; and one each from the American College of Surgeons, the American College of Physicians, the American Medical Association, the American Academy of Occupational Medicine, the Association of American Medical Colleges, the Association of American Schools of Public Health, and the Industrial Hygiene Foundation.

The trustees of the AMERICAN FOUNDATION OF OCCUPATIONAL HEALTH are the President, Secretary, and Managing Director of the INDUSTRIAL MEDICAL ASSOCIATION. DR. EDWARD H. CARLTON, Medical Director of Inland Steel Company, is the immediate Past-President, and DR. A. G. KAMMER is the new President, installed at the annual meeting in Atlantic City in April; DR. ARTHUR K. PETERSON, Medical Director of R. R. Donnelley & Sons Company, is the Secretary; and DR. EDWARD C. HOLMBLAD is the Managing Director and Treasurer. The trustees propose to continue the same type of plant evaluation and approval that the American College of Surgeons has conducted, and to expand this service if and when additionnal funds become available. On its last approved list of medical services in industry, published on December 31, 1950, the College includes the names of 1,459 industrial establishments—63% of the 2,293 plants, representing over 6,045,000 employees, which had been surveyed. DR. GAYLORD R. HESS, who has been in charge of the activity for the College, will continue to direct it for the AMERICAN FOUNDATION OF OCCUPATIONAL HEALTH.

DR. HESS graduated, B.S., at the University of Chicago in 1914, and M.D., at Rush Medical, 1918. He interned at Presbyterian Hospital, Chicago, and Cincinnati General Hospital, Cincinnati. On his return to Chicago in 1920, he received his first industrial medical appointment, with the Illinois Bell Telephone Company on a half-time basis, at Evanston. After a while he responded to an opportunity to become established in his own practice at Momence, Illinois, where he continued his interest in industrial medicine and surgery through appointments as local surgeon for the Milwaukee and Chicago & Eastern Illinois railroads. Here he was active in community affairs, serving two terms as one of the city's aldermen and as a member of the high school board. In 1929, desiring the equivalent of some refresher or post-graduate work, he became Resident Physician at St. Luke's Hospital, Chicago. Three years later he went to the Sherwin-Williams Company as full-time Medical Director, at Chicago. In 1941, after nine years as Medical Director, he was offered a position as Administrative Assistant with the American College of Surgeons in its Division of Medical Service in Industry. This he accepted, and since then he has been identified with the work of the College in evaluating and approving industrial medical services on the basis of the College's Minimum Standard. During his 10 years in this work he personally visited, and made survey studies of, more than 1000 industrial medical departments throughout the United States and Canada. Indicative of the trend toward improvement in the attitude of industries regarding employee medical services, he cites the fact that within only the past several years 70% of the previously non-approved services have been found acceptable on resurvey. In 1946 he revised the College's publication, "Medical Service in Industry and Workmen's Compensation Laws." More than 3500 requests for copies of this booklet have been filled by the College.

GAYLORD R. HESS, M.D.

In the program of surveys and appraisals of medical service in industry, as it will be carried on by the AMERICAN FOUNDATION OF OCCUPATIONAL HEALTH, essentially the same standards will prevail as originally formulated by the A.C.S. All industrial establishments maintaining an in-plant employee medical service are free to avail themselves of the FOUNDATION'S services which, to them, will be without cost or obligation in any form.

DR. HESS will have headquarters at the Foundation offices, 28 E. Jackson Boulevard, Chicago 4.

Medical Directors Club

THE MEDICAL DIRECTORS CLUB OF CLEVELAND was formed recently by a group of eight physicians interested in industrial medicine and public health. The aims are similar to those of the Medical Directors Club of Pittsburgh. The plan is to keep the Club at a membership of about 15, and to meet once a month for luncheon at the Mid-Day Club in downtown Cleveland. At the meeting the members will exchange ideas on matters of common interest. An occasional guest speaker will be invited. The charter members of the new Club are: ARTHUR M. EDWARDS, M.D., Medical Director, American Steel & Wire Company; CHARLES F. GOOD, M.D., Directing Supervisor, School Health Service, Cleveland Board of Education; J. M. HAMILTON, M.D., Head, Medical Department, Warner and Swasey; DON A. KELLY, M.D., Medical Director, Thompson Products, Main Plant, Director of Health, Case School of Tech-

nology, Medical Director, Cleveland Baseball Club, Assistant Medical Director of Health, Western Reserve University; E. M. KLINE, M.D., Medical Consultant, Lamp Department, General Electric Company; WILLIAM W. MARKLEY, M.D., Medical Director, Oliver Corporation, Pesco Products Division Borg-Warner, Reliance Electric Company, Bailey Meter Company, and Ferro Enamel Corporation; ARTHUR L. WATKINS, M.D., Medical Director, Eaton Manufacturing Company and Brewing Corporation of America; and CHARLES A. SWAN, M.D., Medical Director, Standard Oil Company of Ohio.

IMA Officers and Directors

ADOLPH G. KAMMER, M.D., of the Graduate School of Public Health, University of Pittsburgh, is the new President of the INDUSTRIAL MEDICAL ASSOCIATION; E. A. IRVIN, M.D., of Cadillac Motor Division General Motors Corporation, is President-Elect; GEORGE F. WILKINS, M.D., of New England Telephone & Telegraph Company, is First Vice-President; and ROBERT COLLIER PAGE, M.D., of Standard Oil Company (New Jersey), is Second Vice-President. ARTHUR K. PETERSON, M.D., of R. R. Donnelley & Sons, continues as Secretary, and EDWARD C. HOLMBLAD, M.D., as Treasurer and Managing Director. The newly-elected Directors are MILTON H. KRONENBERG, M.D., of Caterpillar Tractor Company; E. P. LUONGO, M.D., of General Petroleum Corporation; CAREY P. MCCORD, M.D., of Industrial Health Conservancy Laboratories; CARL T. OLSON, M.D., of Liberty Mutual Insurance Company; LEO PRICE, M.D., of Union Health Center, ILGWU; and C. RICHARD WALMER, M.D., of Industrial Hygiene Foundation (see page 4).

SCIENCE MINIATURE

Beryllium

RUTHERFORD T. JOHNSTONE, M.D.,

EVERY decade or so a new occupational disease appears in a manner sufficiently startling to attract the attention of practically the entire profession. Phossy jaw, radium poisoning and silicosis are well known examples. Popular interest is usually superficial and is created by sources which play up the sensational aspects. The most recent instance is beryllium poisoning.

It is lamentable that the majority of physicians have derived their information regarding beryllium from the radio and lay press. Such agencies have laid undue emphasis upon the hazard allegedly resulting from the breakage of a single fluorescent tube or lamp. In addition, the publicity given to relatively minor incidents has obscured the real drama played by those investigating the etiology and bizarre manifestations of beryllium pneumonitis.

Those who are familiar with the background of the beryllium investigations readily appreciate the fact that the differential diagnosis, both clinically and roentgenologically, presents a most difficult problem. The list of possible comparable entities is quite long. The purpose of this short item is to add further to this confusion.

During the past several years 14 patients have been referred to the writer, presenting the common aforementioned history of a single exposure to the breakage of a fluorescent tube or a neon light. In no instance did the x-ray films of the chest reveal any fibrosis, nodulation, granularity or anything even suggestive of a pneumonitis, except one. This patient was referred by Dr. William J. Oneal, of Pasadena, who is preparing a complete report for subsequent publication. In deference to his article the details regarding the entire history, the clinical aspects and the laboratory findings will not be introduced here. At this time the following brief reference is sufficient.

After an illness which the patient believed was "flu" a number of symptoms involving various parts of the body and seemingly unrelated were noted. The initial laboratory studies were essentially negative except the x-ray films of the lungs. In reviewing the initial films the roentgenologist inquired of the patient if he had ever been a miner because the "x-rays suggested a pneumoconiosis." Since the patient never had been exposed unduly to a dusty environment, the x-ray findings remained a mystery. Some months later the patient either read or heard of the effects upon the lungs of "dust in fluorescent lamps." He recalled that he had had a single exposure to the breakage of such a tube about four months prior to the onset of his initial illness. It was after his concern about beryllium that he was referred to the writer.

The initial x-ray films revealed a pulmonary pathology characterized by a diffuse mottling of both lung fields although slightly more marked in the right. Also along the periphery of the right lung at the mid-portion there appeared to be a localized infiltration. The ribs were normal. The next series of chest films taken two months later revealed the findings just mentioned, although the localized infiltration appeared less prominent. However, this second set of films showed a rounded area of decreased density in the first left rib measuring approximately 1½ x 1 cm. The cortex along the lateral wall was thin. A third set of x-ray films taken two months after the second series revealed an enlargement of this area of decreased density and a breakdown of the cortex of the lateral wall of the rib.

The involved rib was biopsed for microscopic study and the pathologist reported the bone lesion to be eosinophilic granuloma. Dr. Oneal then pursued further studies which revealed multiple lesions elsewhere, and the studies to date indicate conclusively that the condition is one of Schüller-Christian disease with pulmonary fibrosis.

Admittedly Schüller-Christian disease with pulmonary fibrosis is infrequent. Likewise, exceedingly rare will be the case of one with this disease alleging an exposure to beryllium dust. But at least it did happen on one occasion. This being so, it appears worthy of recording.

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"What's In A Name"

THE old name has given place to the new. The organization known since 1915 as the American Association of Industrial Physicians and Surgeons has been rechristened the INDUSTRIAL MEDICAL ASSOCIATION. The change was accomplished without controversy, but with some reluctance and much regret, for the longer the reach into the past, the more poignant the pangs of nostalgia at the uprooting of a well-established guidepost. The old name was a grand one—linked with traditions, full of memories of personal friendships, of trials borne together, successes shared. It bespoke the pioneer adventure which is now history—begun 36 years ago by the handful of courageous men who braved the disdain, indeed the ire, of organized medicine not only in daring to form their own association but even in having the temerity to align themselves with industry as industrial physicians. Possibly that is why there was hesitancy in it, a sense almost of defensiveness, a suggestion of compromise with conditions too formidable to be overcome—but, withal, a ringing challenge, a call to the hopes and objectives which are now the heritage of realized achievement it bequeaths to its successor. It was a grand name, but it served its turn. The new one is better. The industrial physicians and surgeons who had to use seven words to tell who they were have long since grown to the stature where they need only three to tell what they are doing. They have progressed from a group to a genus. Where they once were considered no more than non-conformists, they are now proved specialists. They made their egis; they are entitled to work under its benison.

Organized Heterogeneity

THERE be those among us who profess to believe that through success, industrial medicine or at least its major organization has attained to a state of amiable complacency, freed from growing pains, unridden by major difficulties. Without alignment with or against any professors, and without recognition of any need therefor, the opinion is projected that any sturdy, large, and growing medical organization profits by, and always is in need of, constructive loyal opposition—hearty diversity of opinion. That reflects interest and prospective action. The intimation introduced implies no sponsorship for carping, rebellious threatening, faction producing, destructive onslaughts. None of that.

The Kentucky thoroughbred horse has acquired unchallenged equine superiority not by standing at stud throughout adult life, but by racing. The best line of this country's hunting dogs attained to canine perfection not through the dog show bench, but by hunting. That means action and competition. Whenever any medical organization seeks to placate its entire membership by eschewing all matters not fully agreed upon, the seeds of its doom then and there have been planted. The voice of this Journal will be lifted in advocacy of gentle controversy—meaning intelligent two-sidedness in matters scientific, economic, political, legal and organizational, all within the areas and disciplines of occupational health. That is healthy.

AT THE present time, and for a long time, one of the little-catalogued bases of minor discontent among organized industrial physicians stems from the essential heterogeneity of activities of

various groups of members. By its very nature the medical personnel of occupational medicine requires industrial surgeons, medical administrators, occupational disease investigators and practitioners, general practitioners of industrial medicine, teachers, compensation and insurance physicians. No association of medical roentgenologists, for example, presents this same heterogeneity. Apart from the ultimate goals of all occupational medicine, there are enormous gaps partitioning the action areas of these several groups constituting the totality of occupational health. This necessary apartness is at once the strength and weakness of organized occupational medicine. Among some, the belief is that certification of industrial physicians as a specialty group is blocked or hampered by the multiplicity of compartments in that field. Every year numerous mild dissidents—not malcontents—grouse over the annual scientific program. Factually the program is neatly balanced, with sharings in deference to every subdivision. The hasty-thinking industrial surgeon, prior to his calm rationalization, finds only thready participation by his group. He would like to see the entire program devoted to clinics, operations, fractures, surgical appliances. He cannot be blamed. That's his need, his professional life. The equally ill-visioned occupational disease investigator loathes clinics and operations. He picks those periods for his sightseeing. In the meantime the industrial medical administrator scorning both surgery and occupational diseases, clans up with his kind in his suite and discusses budgets and records. The fact might as well be faced that complete homogeneity never may be reached, nor is this an essence.

DELIBERATELY roiling the organizational and program waters, it is here proposed that the officers and directors of the INDUSTRIAL MEDICAL ASSOCIATION, recognizing the ever-increasing size and diversity of interests within the Association, provide in addition to general program sessions, permanently organized scientific sections. By this is not meant the perpetuation of the lately-inaugurated practice of little formalized sessions devoted to random topics or selected industries such as mining, heavy metals, agriculture, or chemicals. These constructive random sessions have served a praiseworthy objective. In addition to their inherent worth, they have demonstrated or created a trend—a trend to judicious subdivision. In the light of this pleasing progression, here is a call for sectional organization within the parent association, analogous to that effective in the American Medical Association and the American Public Health Association, but not necessarily at the present time requiring section affiliation on the part of the membership and fellowship. This concept of need encompasses only scientific programs. It may be believed that, on a natural basis, five sections are requisite, viz: (1) Industrial Surgery; (2) Occupational Diseases and Medical Industrial Hygiene; (3) Industrial Medical Administration; (4) The General Practice of Industrial Medicine; (5) Legal Industrial Medicine and Compensation.

IT IS NOT within polite editorial confines to suggest structural arrangements as to sectional organization, officers, representation of the sections on the governing board, elections, eligibility, etc. Warrant is assumed to maintain that such sections readily may be created, and without jeopardy to the parent organization or its general program. This innovation, should it become an actuality, will prove provocative of spurred action on the part of those of specialized interests without serving as a deterrent to sharing in the over-all affairs of the Association.

Granting the existence of a little tenderness over the inescapable high dilution of program items, here is one escape avenue deserving a hearing as to its merits.

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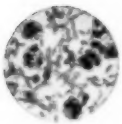

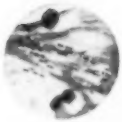

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NEWS, COMMENT, OPINION

Five Days in Washington!

IF A person had started in business in the year A.D. 1 with a billion dollars capital, and if he had managed his business so poorly that he would have lost $1,000 each day, in this year of 1951 he still would have enough capital left out of his original billion to continue in business, losing $1,000 a day, for almost an additional eight hundred years, or until the year 2739.

—*The Maxton Messenger*, May, 1951.

A.C.S. Articles on Health

A FEATURE of the American Chemical Society meeting held in Detroit in April, 1950, was a panel on industrial health and safety. This was arranged by the late JOHN F. MCMAHON, who also served as chairman. The papers have been published serially in *Chemical and Engineering News*. The first, by DR. H. F. SMYTH, JR., "The Field of Chemical Hygiene," was published in the March 26, 1951, issue. The second, "Industrial Hygiene Considerations in Plant Location and Design," by W. R. BRADLEY, came out in the same issue. The third, "Laboratory Safety," by H. H. FAWCETT, was in the April 2 issue; and the fourth, "The Medical Aspects of the Industrial Hygiene Program," by DR. J. H. STERNER, appeared in the April 9 issue.

Indiana

INDIANA, generally considered an agricultural state, is in reality the seventh largest industrial state in the country. The industry is diversified and includes every manufacturing category. Geographically, these industries are scattered throughout the state with a somewhat heavier localization in the northwest section, and some 460,000 Hoosiers are employed in these plants. Although Indiana is a large industrial state, this industry is housed in small installations, for some 96% of all the plants employ fewer than 500 workers. For the last 10 years the incidence of occupational diseases has been steadily on the decrease. Early in this decade it was not unusual to have 600 cases of occupational diseases reported—whereas for the last reporting year there were but 191. In a study of these it is apparent that industrial skin diseases account for roughly 70% of all occupational diseases, with lead absorption or intoxication accounting for some 10%. Another 10% is accounted for in the classification of silicosis and silico-tuberculosis. The remaining 10% is a heterogenous group involving solvents, gases, dusts and mists. Of the rarer occupational diseases the following are of interest: cadmium poisoning from heating cadmium-plated pipe, arsine poisoning by the liberation of arsine from a lead dross, phosgene poisoning from the conversion of trichlorethylene to phosgene when trichlorethylene vapors went through a heated oil stove located near the degreasing tank. All the above were fatal exposures. Less serious episodes involved the deposition of cupric oxide dust on the skin, producing thereby a "green skin," dermatitis from the fabric finish used on nylon hose, sporotrichosis among florists, and mercury poisoning in the manufacture of a mercury battery.

Costly

THE YALE PLAN ON ALCOHOLISM estimates the annual cost to industry from preventable accidents due to alcoholism alone, at $120,000,000. Total cost is of course difficult to arrive at, due to the many hidden factors involved, but those who have attempted to estimate the annual loss of man-hours from such accidents and from hangovers, fatigue and other inefficiencies arising from alcoholism, speak in terms of approximately $500,000,000 a year.

—BARRETT WILLIAMS in *Industry*, 3, '51; quoted in *The Management Review*, April, 1951.

Golf

GOLF increases the blood pressure, ruins the disposition, spoils the digestion, induces neurasthenia, hurts the eyes, callouses the hands, ties kinks in the nervous system, debauches the morals, drives men to drugs, drinks and homicide; breaks up the family, turns the ductless glands into internal warts, corrodes the pneumogastric nerve, breaks the edges off the vertebrae, induces spinal meningitis and progressive mendacity, starts

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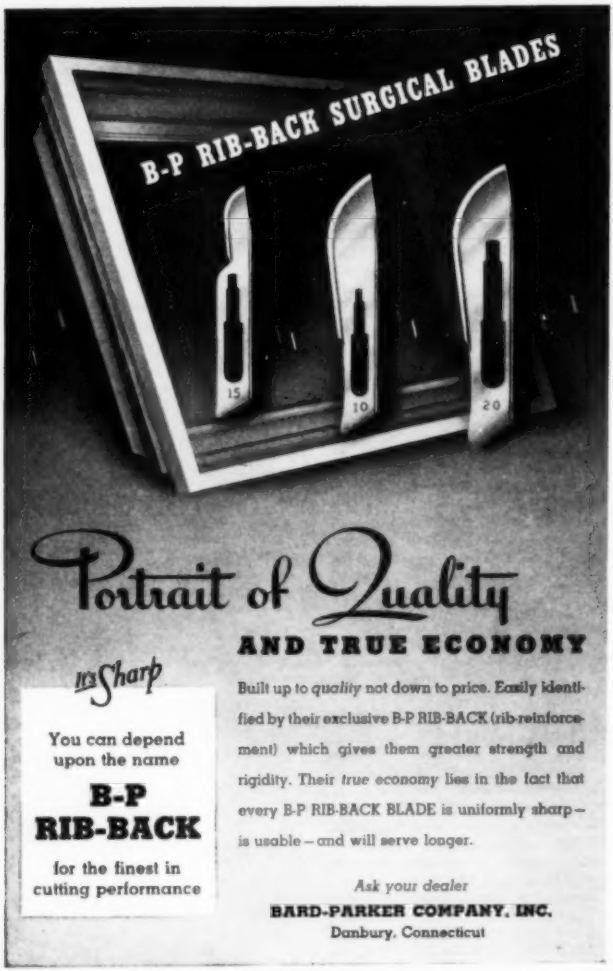
Booth A-8 A.M.A. Convention.

angina pectoris, and breeds wind on the stomach. But golf keeps the doctors out in the open air, and gives the people in hospitals and sick-rooms a chance to get well. Public health is better because of golf, generally speaking.

—*Sioux City Punch*, quoted in *Jackson County Medical Society Weekly Bulletin*, May 5, 1951.

M.I.T. Medical Service

THE Occupational Medical Service at the Massachusetts Institute of Technology opened its new Industrial Hygiene Laboratory in the Homberg Infirmary, on May 8, 1951. According to DR. DANA L. FARNSWORTH, Director of M.I.T.'s Medical Department, the program and equipment of the Occupational Medical Service are among the most extensive in any American educational institution. DR. HARRIET L. HARDY is Assistant Medical Director, in charge of the Service. The equipment of the new Industrial Hygiene Laboratory includes all facilities for the analysis of toxic materials in air, liquids, and biological materials. Various types of air sampling units are available, and portable equipment for "on-the-spot" measuring of such atmospheric contaminants as mercury, benzene, carbon monoxide, hydrogen sulfide, harmful dusts. A feature of the laboratory is a 350-cubic-foot dust and gas chamber for accurately calibrating instruments used in measuring toxic materials. The new facilities will make possible skilled advisory activities and extensive testing services for all departments and laboratories at M.I.T., to assist in developing the most beneficial environment possible for all kinds of scientific and professional work. In addition, the Service will conduct classes to train M.I.T. students in the essential requirements of a safe and effective environment for scientific and industrial work. "The problem of analysis and correction of hazards due to radioactive or toxic chemicals or dusts, as well as the more subtle problems of unusual occupational stress, noise, and lighting, are included within our assignment," DR. HARDY said. All illnesses of Institute personnel will be screened by the members of the Medical Service, and those appearing to be job-related carefully investigated through interviews and appropriate tests.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Anti-Binge Therapy

DR. F. J. STARE, of Harvard University School of Public Health, at a conference of the American Institute of Nutrition at Cleveland, May 3, reported that massive doses of vitamins are causing some chronic alcoholics to lose their craving for liquor. He said the new vitamin therapy has given encouraging results in 85 patients treated during the last eight months. They were given the vitamins by mouth in amounts approximately 20 times greater than ordinarily administered to overcome deficiencies of the same substances in the diets of non-drinkers. Every recognized vitamin was fed during the investigation still in progress. Amounts given daily in concentrated form to each patient included

50,000 units of vitamin A, 20,000 units of vitamin D, 30 milligrams of thiamine chloride (B-1), and 20 times the normal dose of vitamin C and all other fractions of the B complex. For control purposes, the patients occasionally were switched to placebos. Some said the dummy pills also lessened their craving for alcohol, indicating they were being influenced by psychological factors. Nevertheless the over-all beneficial effects achieved in cutting down the craving for alcohol were about 33⅓ greater in patients who received the vitamins than those fed the dummy pills. Although it is too early to draw any general conclusions from the Harvard observations, DR. STARE said it is possible there may be some relation between poor nutrition and the craving for alcohol in humans. Most alcoholics who go on long binges are undernourished, he noted. It is possible that periodic drinkers likewise may lack their full quota of nutritional substances, causing them to go on occasional sprees.

—ROY GIBBONS, in *Chicago Tribune*, May 4, 1951.

Not With Committees

I DO NOT believe in the capacity of the state to plan and enforce an active high-grade economic productivity upon its members or some of them. No matter how numerous are the committees they set up, or the ever-growing hordes of officials they employ, or the severity of the punishments they inflict, or threaten, they cannot approach the high level of internal economic production which, under free enterprise, personal initiative, competitive selection, the profit motive to rectify failure, and the infinite processes of good housekeeping and personal ingenuity, constitute the life of a free society.

—WINSTON CHURCHILL, quoted in *Curtis Courier*, April, 1951.

New Names

INDUSTRIAL *Health Monthly* is the new title of the official publication of the Division of Industrial Hygiene, U.S. Public Health Service. With the April, 1951, issue, the new name succeeded the 10-year designation "Industrial Hygiene Newsletter." The *Industrial Health Monthly* is mailed free of charge to personnel in government employment, on request to the Division of Industrial Hygiene, Public Health Service, Washington 25, D.C. It is available to others for $1.00 a year (domestic mailing) or $1.25 (foreign mailing) from the Government Printing Office, Washington 25, D.C.

When a physician, writing on the subject of sprains,* advises *"a compression bandage, preferably ACE elastic"*, he indicates the preference of physicians generally.

With ACE Cotton No. 1, all cotton elastic bandage, **ACE Reinforced No. 8,** cotton elastic bandage reinforced with rubber, and **ACE No. 10 Adhesive Elastic Bandage,** cotton elastic bandage with adhesive backing, the physician can obtain varying degrees of compression or support to meet the requirements of each individual patient.

*Prognosis on Sprains: Insurance Medicine, June-July-August, 1949, Page 17.

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Costs

IN A LARGE manufacturing company where all costs of safety, workmen's compensation and other employee insurance, and medical department expenses are merged under one heading, the cost per employee is at present $70.00 per year. In another manufacturing situation with a large number of employees, the medical department costs per employee per year have been as follows: 1942, $9.55; 1949, $15.39; 1951, $20.00 plus. This is solely for the medical department and

does not include safety or other services.

Refresher Course

PHILADELPHIA INTERSTATE ASSOCIATION OF INDUSTRIAL MEDICINE, together with the Philadelphia County Medical Society Section on Industrial Health, sponsored a recent Refresher Course in Industrial Health under the title "New Trends in Industrial Medicine." The schedule of lectures, attended by between 50 and 60 industrial physicians, industrial hygienists and industrial nurses, was as follows:

March 8: "New Trends in Industrial Medicine" — LEONARD GREENBURG, M.D., Executive Director, Division of Industrial Hygiene, New York State Department of Labor.

"Radiation Hazards" — THEODORE P. EBERHARD, M.D., Jefferson Medical College.

March 15: "New Toxic Hazards"—LEMUEL C. McGEE, M.D., Hercules Powder Co., and University of Pennsylvania.

"Medical Control of New Toxic Hazards"—ALLAN J. FLEMING, M.D., E. I. du Pont de Nemours & Co.

March 22: "New Protective Devices"—Representative, Mine Safety Appliances Co.

"Occupational Skin Diseases: New Causes and Methods of Prevention"—LOUIS SCHWARTZ, M.D., Former Medical Director, U.S. Public Health Service.

March 29: "Trends in Compensation Legislation"—DAVID L. ULLMAN, ESQ., Philadelphia.

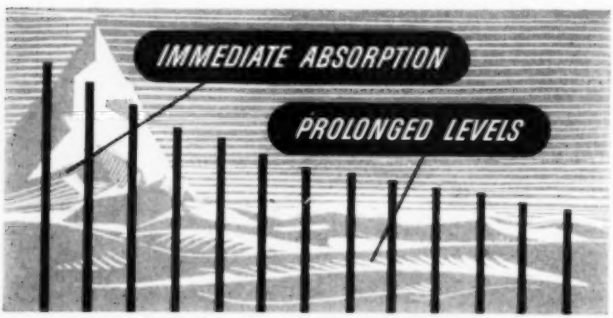
Discussion led by CHARLES-FRANCIS LONG, M.D., Bayuk Cigar Co., and Woman's Medical College.

April 5: "New Methods in Rehabilitation"—EDWARD W. LOWMAN, M.D., Institute of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center.

"Rehabilitation Surgery"—SAMUEL H. JOHN, M.D., Philadelphia.

April 12: "Employability in Periods of Full Employment"—GLENN S. EVERTS, M.D., Curtis Publishing Co.

Summary and Discussion—Panel of Lecturers.



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Study Club International

GENERAL Practitioners Study Club International is holding its Annual Convention, September 1 to 25, 1951, at Rome, Italy. Lectures will be held enroute at London and Paris. A Pan-American "Strato" Clipper has been chartered which will leave New York September 1, 1951, returning from Lisbon September 25, 1951. All principal countries in Europe will be visited. All physicians, their families and friends are invited to attend this gathering of General Practitioners. The complete cost of the trip will be $1,295 with the exception of meals in London and Paris. Address JOHN O'CONNELL, M.D., 10300 Lackland Road, St. Louis 14, Missouri, for itinerary and reservations.

Cardiac Rehabilitation

IN ADDITION to our duties in evaluating the health of life insurance risks, our Medical Department in the Fidelity Mutual Life Insurance Company in Philadelphia has the responsi-

bility of keeping 355 employees in fit physical and mental condition for their jobs. We try to do so by first requiring a pre-employment examination which we do ourselves and which includes, in addition to the usual complete history and physical examination, a chest x-ray, an electrocardiogram, and blood studies including blood sugar. Every employee who becomes ill on duty or who has been absent due to illness reports to the Medical Department for review and clearance before returning to work. Each year during his or her birthday month every employee has an annual follow-up examination including a chest x-ray, an electrocardiogram every five years after 35, and every two years after 50. If intervening circumstances require adjustment to employment, the employee is seen when necessary. As a result of this health conservation program, our Medical Department knows the exact health and cardiac condition of every employee at all times. This is the first and most important step in any employee rehabilitation program. The need of such accurate information has been emphasized by a recent joint study conducted by the Rehabilitation Committee of the Philadelphia Heart Association and the Cardiac Division of the State Rehabilitation Bureau which indicates that 10% of those referred to the Cardiac Division of the State Rehabilitation Bureau are found on closer study to have no heart disease of any kind. A review of the records of our employees made currently shows that we have one with congenital heart disease, age 33; seven with rheumatic heart disease, ages 19 to 62; 21 with essential or benign hypertension, varying in age from 43 to 79, and three with coronary heart disease—altogether 32 with significant cardiovascular conditions. In addition, we have under observation 29 who have had temporary elevations of blood pressure, 12 with borderline electrocardiograms, and eight with other borderline cardiovascular findings. Every one of these employees is working full time, has an intelligent understanding of his or her heart condition, and has a genuine respect for the impairment, but fear of it has been dispelled. They progress in their employment as do others without impairment, enjoy all the benefits including Blue Cross, Blue Shield, disability, group insurance and pension rights, appreciate their jobs more so than others, and are, in general, a happy, loyal, and efficient group. The absences due to illness of those employees with cardiovascular impairments have averaged 3.3 days per year during the last five years as compared with 3.6 days for our entire body of employees. Among 355 employees, not a single one with cardiac disease is out on disability; 32 with cardiac disease are working full time, all with an intelligent understanding of their heart impairment, free from fear of it, and living happy and useful lives. This is modern medicine

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—From "Cardiac Rehabilitation in Action in Industry," by LAURITZ S. YLVISAKER, M.D., in *Pennsylvania Med. J.*, February, 1951.

The Trend

TO WHAT bounds the ever-expanding field of industrial medicine may ultimately extend is a subject for speculation. At the beginning of this second half of the present century, it is difficult, if not impossible, properly to orient industrial medical activities in the framework of conventional medical practice. The trend, however, is unquestionably toward industrial medicine's becoming a social science rather than a fragment of traditional medicine and surgery practiced on industry's premises. Its scope and importance, far from diminishing since the close of World War II, are greater today than ever, as industry continues to expand and the need for conserving manpower persists. In the next 50 years, more and more medical practice will be encompassed within the industrial framework; the individual's occupation may become the focal point for health programs affecting every area of his life, the community and the nation.

—From "Medicine as a Social Instrument: Industrial Medicine," by IRVING R. TABERSHAW, M.D., in *New England J. Med.*, April 26, 1951.

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Eye Safety

DURING the first seven years of the Sperry Gyroscope Company's eye safety program, "not one eye has been lost in our machine shops and foundry, and not one serious eye injury has occurred resulting in partial loss of sight." But during a nine-month period before the program was started, "a total of six eyes were lost and 56 serious eye injuries were reported, many resulting in partial loss of sight." So reported DR. HERMAN SAGER, supervisor of eye service for the Sperry company, at the annual Conference of the National Society for the Prevention of Blindness, March 28-30, 1951. From January through August, 1943, DR. SAGER told the Conference, the six lost eyes and 56 serious eye injuries which occurred at Sperry "entailed an expenditure of over $200,000 in direct and indirect costs, and approximately 700 workdays were lost."

Pon My Word

ATLANTIC CITY, April 23—The Greeks had a word for it and now the American Association of Industrial Physicians and Surgeons has a word that descibes its specialty. According to DR. CHARLES E. DUTCHESS, Medical Director of Schenley Laboratories and a member of the group which is holding its meeting here, these physicians are all practicing poniatrics. Hastening to explain,

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DR. DUTCHESS also stated that: (1) the "o" is pronounced as in pond; (2) Poniatrics means occupational or industrial medicine; (3) It comes from the Greek, ponos, meaning to work, and iatrikos, meaning to heal.

Hepatitis Occupational Hazard

A LIVER infection called hepatitis has proved to be a definite hazard to medical personnel working with blood and blood derivatives, two Memphis physicians write in the March 31, 1951, issue of *J.A.M.A.* The physicians, Drs. Merlin L. Trumbull and D. J. Greiner, said the disease can be transmitted by minute quantities of infected blood or serum introduced into the system through a small opening or scratch in the skin. In four Memphis hospitals during a three-year period, 16 cases of hepatitis occurred among medical personnel. In all cases the patients had occupations which exposed them to blood or serum, many reporting previous scratches or needle pricks on hands while working with blood. None had received transfusions or immunizations for at least a year prior to their illnesses, nor did they give histories of previous diseases suggestive of hepatitis. In every instance, the onset was gradual, with loss of

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appetite, nausea and frequent vomiting or diarrhea before jaundice. The physicians believe hepatitis among medical personnel may increase, owing to the expanding use of blood and its derivatives. They reported that in a survey of occupational diseases among the medical personnel in two of the hospitals mentioned in the report, hepatitis was the most common during this three-year period.

The First

IN 1945 the Medical Section of Indiana's Division of Industrial Hygiene developed a program whereby the employees of the State Board of Health would receive the same basic industrial medical services as those in private industry. This Division of the state government assists industry in developing such programs and yet did not have a similar program in its own organization. The Medical Section thought that it was not practicing what it was preaching. Thus in 1945 a program was developed. During the following years the program grew, adequate space was obtained, and by 1950, a full-fledged industrial medical service was in opeartion. This was surveyed by the American College of Surgeons in November, 1950, and following this survey was granted the A.C.S. Certificate of Approval. This is the first industrial medical service of any state board of health in the nation to be certified by the American College of Surgeons.

Marxist or Freudian?

THE following item, written by Bennett Cerf, is taken from the *Herald Tribune Sunday Magazine* of April 8: "This June, Harvard '26 will stage its twenty-fifth reunion, and in preparation for same, mailed a confidential Kinsey-like questionnaire to its members. One budding George Apley returned his promptly, blank, save for this marginal comment: 'In my opinion, sex is a subject to be discussed with women, not with an International Business Machine.'" Curious as to the proper classification of this reaction in these days of enlightened psychological perception and knowledge, we looked up our book on psychoanalysis and read two chapters. With only an amateur standing in this discipline we were unable to determine whether it was due to reticence, resistence, regression, or recognition of reality. Thoroughly confused, we compensated for our ignorance by recognizing and identifying ourselves with the stark and singular courage of this man, albeit a Harvard graduate, who dared to defy the growing army of scientists who devote their lives to research in damp underwear, while the Elm disease, the boll-weevil, the Japanese beetle, and the Asiatic giant snail are despoiling and ravishing the foilage of our fair land. Even so, we are not entirely happy since we are not sure where this reaction leaves us.

—Editorial in *Westchester Medical Bulletin*, May, 1951.

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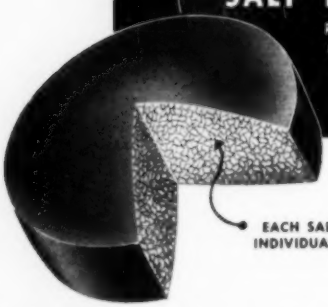

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Time to Reaffirm

RESOLUTION adopted unanimously by the delegates to the annual Spring Convention of the American Council of Christian Churches, meeting in Nashville, Tennessee, April 25-29, 1951: "The American Council of Christian Churches reaffirms its resolution of April, 1949, against socialized medicine. Freedom of the individual, freedom of the doctor, and freedom of medical research are essential to the preservation of a free society. We are aware of the fact that among the clergy and in certain church groups there is increasing pressure for government socialism beginning with socialized medicine. The leadership of Methodist Pink Bishop G. Bromley Oxnam on the committee for the nation's health spearheading this drive is only a part of the over-all program to socialize the entire world under the guise of establishing the Kingdom of God. The tyranny, abuse, corruption, confusion, demoralization, and irresponsibility attendant upon any effort to make the state responsible for a person's health will be a valid judgment of the Almighty God upon those who lightly esteem their God-given freedom. No state can assume either the responsibility which belongs to an individual or the prerogatives which belong to God Almighty. Christian people must expose and resist the campaign now being waged for socialized medicine. These appeals actually are based upon the lowest motives, including the offer of something for nothing in order to win votes."

—American Council Christian Churches.

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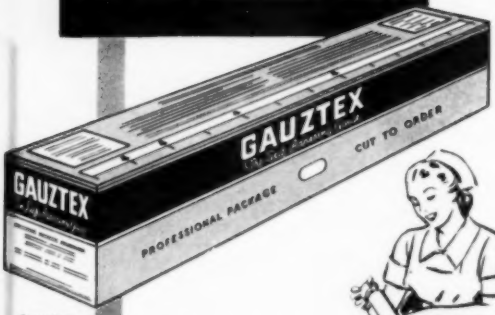

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SUBLINGUAL ANALGESIC

- **Absorbed from oral mucosa**
- **Directly into blood stream**

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Post Tonsillectomy	2 minutes
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- Many other dramatic cases reported

1. Hoffman, Murray M., Ill. Dent. Jl., 19:439-445 (Oct., 1950)
2. McNealy, Raymond W., Ill. Med. Jl., 97:150 (Mar., 1950)

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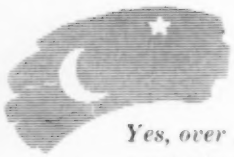

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Abbott Laboratories 26
Aloe, A. S. Company 47
Ames Company, Inc. 29
Armour Laboratories 12, 13
Bard-Parker Inc. 40
Bauer and Black 16
Becton-Dickinson Co. 41
Breon, George A., Company 23
Bristol-Myers Co. ..... 11 and 3rd cover
Carbisulphoil Company 50
Central Pharmacal Company 21
Ciba Pharmaceutical Products ..... 4th cover
Chesebrough Manufacturing Co. 30
Church Chemical Co. 48
Commercial Solvents 42
Desitin Chemical Co. 43
Dome Chemicals 44
Eaton Laboratories ..... 2nd cover
General Bandages 48
Hillman Pharmaceutical Co. 45
Kremers-Urban Company 34
Lilly, Eli and Company 36
Merck and Company 31
Milburn, The Company 32
Minnesota Mining and Manufacturing Co. 7
Numotizine, Inc. 50
Parke, Davis & Company 1
Pfizer, Charles & Co. 37
Philip Morris & Co., Ltd. 33
Picker X-Ray Corp. 2
Reese Wooden Sole Shoe Co. 45
Roerig, J. B. Company 20
Scheuley Laboratories 5
Schering Corp. 9
Shield Laboratories 49
Standard Pharmaceutical Co. 45
Tarbonis Co. 27
Tyree, J. S. Chemists 25
U.S. Safety Service Co. 46
Wallace and Tiernan 47
Warner, William R. Co. 14
West Disinfecting Co. 17
White Laboratories 15
Whitehall Pharmacal Co. 38
Whittier Laboratories 18, 19
Winthrop-Stearns, Inc. 24
Woodward Medical Personnel Bureau 39
Wyeth, Inc. 22, 28, 35

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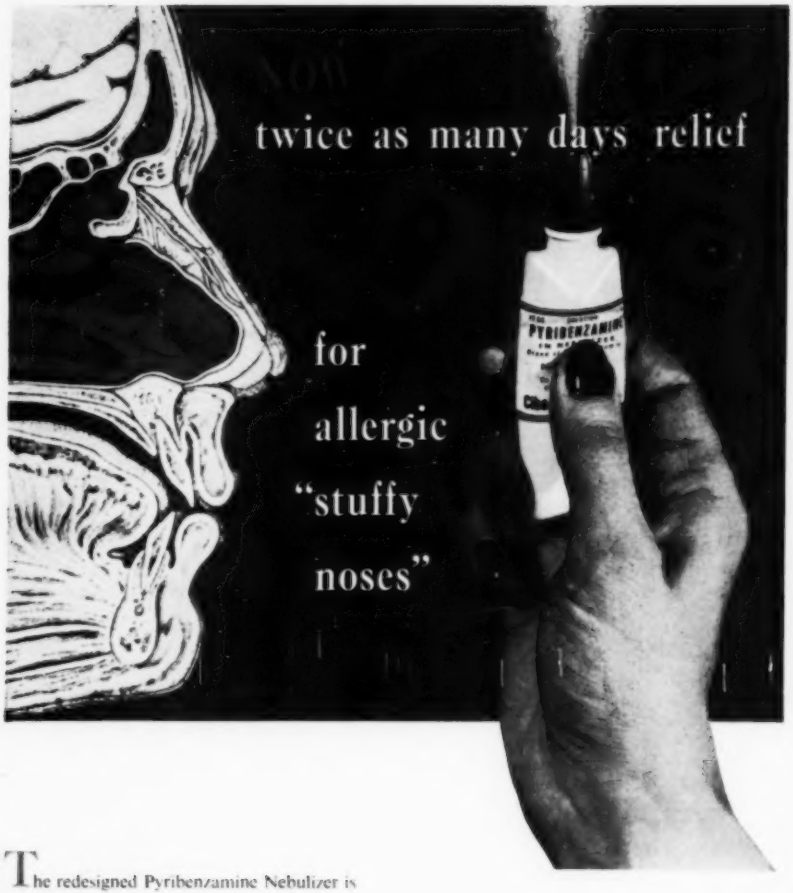

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